The Commercial Car Journal

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Formulate Plans for the Standardization of Wheel Hubs

Manufacturers of Axles, Bearings, Wheels and Tires, Meet to Discuss the Standardization of Wheel Hubs

ATLANTIC CITY, June 7th.—At a meeting held under the auspices of the Automotive Wheel Association, about forty-five representatives of the automotive industry met this morning to discuss the standardization of wheel hubs both for truck and passenger car wheels. That this subject is one which has been uppermost in the minds of a great many wheel and axle companies, is apparent when reviewing the list of men who made it their business to attend this convention. After hearing of the difficulties and the great deal of unnecessary work which is being done today in the manufacture of wheel hubs and wheels, due to the lack of standardization, most of those who attended the convention felt that this was a subject which must be tackled without any further delay. There are so many problems connected with the standardization of wheel hubs that the members had quite a time getting down to a definite line of action. It seems that this is a problem upon which both the axle builder and the bearing builder must come to a general understanding.

The meeting was opened by an address of welcome by R. H. West, president of the Automotive Metal Wheel Association. Mr. West gave a brief talk on the object of the association, and welcomed the Automotive Wood Wheel Manufacturers' Association and the axle manufacturers to the meeting.

A few papers were read during the morning session, all of which portrayed the immediate need for standardization of wheel hubs, following which a great deal of discussion ensued as to the best method of attacking the problem.

The concensus of opinion was that for the time being consideration should be given only to front hubs for both passenger cars and trucks. The idea being that by starting somewhere and gradually working upward, something definite could be accomplished. One of the points brought out in the discussion was that this problem is one which requires salesmanship on the part of the wheel makers in interesting the axle manufacturers. It was stated that the axle manufacturers are anxious for standardization, and that if the wheel makers could agree upon a standard line of hubs, the axle manufacturers would undoubtedly redesign their products to fit the standard design.

The morning session terminated at 12.30, after which a luncheon was served. The afternoon session began at 1.30. After discussing generalities for a period of half an hour or so, it was decided to appoint a special committee for the purpose of drafting up specifications, as it was felt that such a procedure was impossible with a large gathering. This committee consisted of Messrs. Burrows (chairman), Rohde, Putnam, Walthers, Van Halteren, Burnett, Maier, Bell, Finnie, Laycock, Nides, Jandus, Coapman and Myers.

This committee attacked the problem by passing a motion to consider first of all the spacing of wheel bearings in relation to the center line of the tread.

A second motion was carried "to consider the length and size of axle, and that two standards be adopted for each load capacity for passenger cars weighing less than two thousand pounds, and two standards for those weighing up to four thousand pounds." The idea is to have two diameters and two lengths of spindle, so as to take in both ball bearings and roller bearings.

A motion was then carried to have one sub-committee appointed, consisting of five members, of which Cornelius T. Myers was appointed chairman. This committee then went into session for the purpose of drafting up a questionaire which is to be sent out to all axle bearing and wheel makers, and from which questionaire the standards will be drawn up. It is to be hoped that the manufacturers receiving this questionaire will give this matter their most serious consideration and supply the information desired as promptly as possible. It is only with the close co-operation of the manufacturers that this standardization problem can be pushed to completion rapidly.

The second day of the convention was given over to routine matters and the election of officers.

Members and Guests Who Attended the Convention

E. WIDER, Standard Steel & Bearings, Inc.
R. J. BURROWS, Clark Equipment Co.
F. GORDON REED, Harvey Rim & Wheel Co., Inc.
LOUIS H. ROGGE, Dayton Wire Wheel Co.
A. N. WILCOX, Dayton Wire Wheel Co.
T. P. BELL, Gurney Ball Bearing Co.
O. T. ROHDE, Wire Wheel Corp. of America.
M. W. BARTLETT, Wire Wheel Corp. of America.
J. H. HAMMES, The Sewell Cushion Wheel Co.
F. J. STORM, The Sewell Cushion Wheel Co.
H. J. HOSSBEIN, Jaxon Steel Products Co.
RUSSELL HOOPES, Hoopes Bro. & Darlington, Inc.
WM. HOOPES, Hoopes Bro. & Darlington, Inc.
J. E. HALE, Goodyear Tire & Rubber Co.
D. G. NORRIS, Goodyear Tire & Rubber Co.
R. P. DOWSE, Goodyear Tire & Rubber Co.
H. C. COXEY, Alloy Elect. Steel Casting Co.
E. NIDES, Standard Steel & Bearings, Inc.
R. P. FLOWER, Standard Steel Casting Co.
H. C. MUHLBACH, International Motor Co., N. Y.
A. L. PUTNAM, Detroit Pressed Steel Co.
W. E. WILLIAMS, American Steel Foundries.
R. F. FILBERT, All-Steel Wheel Company.
D. CHAS. MURTHA, All-Steel Wheel Company.
W. K. KRIPS, All-Steel Wheel Company.
S. VANCE LOVENSTEIN, The Schwartz Wheel Co.
ARTHUR M. LAYCOCK, Sheldon Axle Co.
J. COAPMAN, Russell Motor Axle Co.
HERBERT S. JANDUS, Standard Parts Co.
ROBT. S. BURNETT, S. A. E. Standards Committee.
CORNELIUS T. MYERS, Consulting Engineer.
ANDREW S. VAN HALTEREN, Pruden Wheel Co.
ALBERT G. METZ, Commercial Car Journal.
JOHN F. CRAEMER, Firestone Steel Products Co.
T. M. CHIPMAN, Power Wagon.
HALDEMAN FINNIE, Timken-Detroit Axle Co.
J. ED. SCHIPPER, Automobile Industries.
RALPH H. WEST, West Steel Castg. Co.
GEO. L. LAVERY, West Steel Castg. Co.
GEO. WALTHER, Dayton Steel Fdry. Co.
J. H. HISCOCK, Wire Wheel Corp. of America.
W. A. YOUNG, Dayton Steel Foundry Co.
WM. REID, Harvey Steel Wheel Co.

The March statistics of the U. S. Geological Survey show an increased output of crude oil in practically every state, even the old Appalachian fields showing an increase of 10,000 over March, 1919, and 400,000 more than March, 1918. Total increase for the United States in March, as compared with March, 1919, an excess of 6,000 barrels, again of 20 per cent. Yet six and a half million barrels were imported from Mexico in March. 3,000,000 more than in march, 1919. The March, 1920, consumption of crude petroleum exceeded that of March, 1919, by nearly 12,000,000 barrels. The United States is now using more oil each month than the whole world used in 1885.

Factory Service Managers Must Co-operate More Intelligently With Local Service Stations

Standard Policy for Service and Repair Parts Revised. Favor Discounts to Independent Repair Shops. Service More Important Than Sales

INDIANAPOLIS, IND., May 26th.—At the second convention of Factory Service Managers, held under the auspices of the National Automobile Chamber of Commerce, the need for a closer contact between the factory men and the local service managers was given much attention. Another important phase of this convention was that the members present went on record as favoring a discount to independent service stations and repair shops, the authority for allowing these discounts to be left to the discretion of the local dealers or the factory, as the case may be. The object of obtaining the sense of the meeting on this question was to permit the chairman of the meeting to report to the National Automobile Chamber of Commerce how the service managers felt about giving such discounts.

Quite a number of papers were read during the first two days, while the third day was given over to trips through local factories. Practically all of the phases of the service problem were discussed pro and con, such as the relationship between the sales and service departments, the flat rate, maximum estimate, approximate estimate, and the time and labor system. A great deal of discussion arose on the subject of supplying the parts and service for assembled passenger cars and trucks. The advantages of large parts stations, centrally located, was brought up repeatedly by certain individuals, but the issue was cleverly sidestepped by the meeting as a whole.

Incidentally, the meeting was given over more to discussing passenger car service than truck service, and as a result the opinion was voiced that it would perhaps be of advantage to set aside a day at the next convention, at which truck service could be discussed exclusively.

The next convention is to be held at Cleveland, date to be announced later.

Among the thoughts that were brought out in the various papers, the subjects of proper lubrication and greasing were most prominent. Most local service managers stated that if more attention were given to the lubrication and oiling of the vehicle, a great many of the local service man's problems would be eliminated. In summarizing the papers read, it might be said that more attention was given at this meeting to the subject of service, as it affects the local service manager, than it does the factory man.

A number of local men from Indianapolis shops were present, and these men felt satisfied with the results of the meeting, as these men had an opportunity to get up and tell the factory men what they were up against. The criticisms made by the local men were that the factory men do not appreciate and know nothing about the difficulties which confront the local man in his daily work, trying to keep customers satisfied. The main criticisms made were in regard to the lack of attention which some factory service men gave to the request for parts and, although telegrams and long-distance phone calls were resorted to, the necessary part was in some cases not mailed until a week or more after the first request reached the factory.

This condition seems to be more prevalent in connection with small parts, rather than with the major units of the car or truck. This all goes to show that a great many of the service problems can be overcome when the forwarding of parts is done with more dispatch.

In conclusion, it might be stated that this meeting had a good moral effect on many of the factory service men, for the simple reason that some of the things which caused the local men a great deal of trouble were brought directly to their attention.

WHEREAS, There being an insistent demand on the part of the independent garage owners to be accorded a discount on repair parts.

BE IT RESOLVED, That it is the sense of this meeting.

(1) That such a policy under certain local or geographical conditions probably would better owners' service.

(2) That a discount be granted independent garages in such locations where a real need exists and where the garage can qualify as competent.

(3) That the judge of need and competency be, in distributor territory, the local representative or dealer and in open territory, the factory.

Service and Repair Parts Policies Adopted at the Service Managers' Convention

1. Manufacturers' Square Deal Warranty

Satisfactory relationship between manufacturer and user is contingent upon mutual good faith. All manufacturers should guarantee to make good all their obligations expressed or implied which will assure each and every user the maximum of truck service and at the minimum of constant cost.

2. Distributors' and Dealers' Responsibility

The best maintenance results can be obtained with the user through distributors and dealers representing the manufacturer. The distributors' and dealers' service obligations are:

(a) To carry out the Manufacturers' Square Deal Warranty with the user.

(b) To maintain adequate facilities for making repairs, adjustments, and do general overhauling in a prompt and competent manner at reasonable charges.

(c) To thoroughly instruct the user in the proper care and operation of the truck.

3. Users' Responsibility

The greatest responsibility for satisfactory truck service rests upon the user. The responsibility of proper operation and care are entirely beyond the control of the manufacturer and distributor. Upon the user, carrying out consistently and intelligently the instructions on care and operation depends the success of truck service.

DETAIL PRACTICES MANUFACTURERS' RESPONSIBILITY

Replacement of Defective Parts:

(a) Within ninety days after delivery of a new truck to user, the manufacturer will furnish, free of charge at the factory or branch, duplicate parts to replace any parts that are returned to the factory or branch, with shipping charges prepaid, and which are determined by the company to have been defective in material or workmanship, or it will put such parts in condition as good as new without charge.

Repair Parts Service:

(b) Discounts to independent repair shops will be subject to agreement between distributor or dealer and the repair shop.

(c) The manufacturer reserves the right to dispose, within thirty days, all parts returned, without assuming liability, unless covered by shipping instructions or adjustment is accepted.

(d) The manufacturer will refuse to consider plans for, or accept for adjustment, any parts not supplied by him.

Accessory Service:

(e) For service and replacements on engine starters, batteries, magnetos, generators, carbureters, tires, rims or other trade accessories that are not made by the manufacturer of the truck, application should be made direct to the nearest service station maintained by the maker of such accessory. While not assuming any direct responsibility for articles made by them, the manufacturer, its branches or dealers, will do all possible to assure the user of a square deal from the maker of these parts or accessories. If, however, the accessory dealer is not adequately represented in a particular locality, the dealer therein is obligated to give the proper service on such accessories.

(f) Manufacturers provide dealers with a list of manufacturers of accessories used on their trucks and a list of service stations.

DISTRIBUTORS' AND DEALERS' RESPONSIBILITY

Inspection and Adjustment:

(a) Trucks brought to service stations maintained by factory, branch or dealer will be inspected monthly without charge. The same service will be rendered at points outside of the service station at a regular charge based on the distance. Inspection includes examination and report by the inspector of his opinion of the condition of the truck.

(b) Necessary adjustments, to put the truck in standard operating condition, will be made without charge during the first month after delivery of a new truck to user, provided the truck has not been tampered with nor injured by accident, abuse or neglect. After the first month, adjustments will be made at the regular charges of the service station. Adjustments includes only such adjustments as the inspector has, in his opinion, found necessary to put the truck in standard operating condition.

(c) Every dealer is expected to give the same inspection and adjustment service on any truck made by the manufacturer without regard to the territory in which it was bought.

Repairs, Replacements, etc.:

(d) All work not included in inspection and necessary adjustment or installation of replacements will be charged for at regular rates.

(e) When any charge work is to be done and the cost can be estimated in advance, the user, upon request, will be advised of the approximate or maximum amount of the charges before the work is begun.

(f) When it is necessary, for the convenience of the user, to render service at a distance from the service station, the time spent by employes going to and from the job will be charged for at the regular rates of the station, together with all proper expenses of making the trip, cost of shipping parts, if any, and other necessary incidental expenses.

Overtime Work:

(g) Any overtime, holiday or Sunday work done upon the request of the user, will be charged for at the regular overtime rate.

Instruction:

(h) On delivery of a new truck, personal driving and maintenance instructions will be furnished for a reasonable period without charge. All other personal instructions will only be given in accordance with the agreement between the customer and the dealer at the time of purchase.

Repair Parts:

(i) The dealer will be required to maintain a minimum stock of both "current" and "service" parts as specified by manufacturer.

(j) The dealer will be required to furnish an inventory of current and service parts upon request.

(k) Stocks of parts shall be designed as follows:

1. **Current Parts**—All parts used in trucks of models being produced by the factory.

2. **Service Parts**—All parts for models no longer being produced by the factory and which have not been superseded by other parts that are interchangeable with them.

3. **Obsolete Parts**—Parts that have been superseded by other parts that are interchangeable with them.

Return of Parts:

(1) Parts claimed defective must be returned to the factory with shipping charges prepaid, within ten days from date of replacement. The date when defect was discovered, manufacturer's number of the truck and owner's name and address must be given on a tag attached to part.

(m) Obsolete parts may be returned only by individual agreement with the manufacturer.

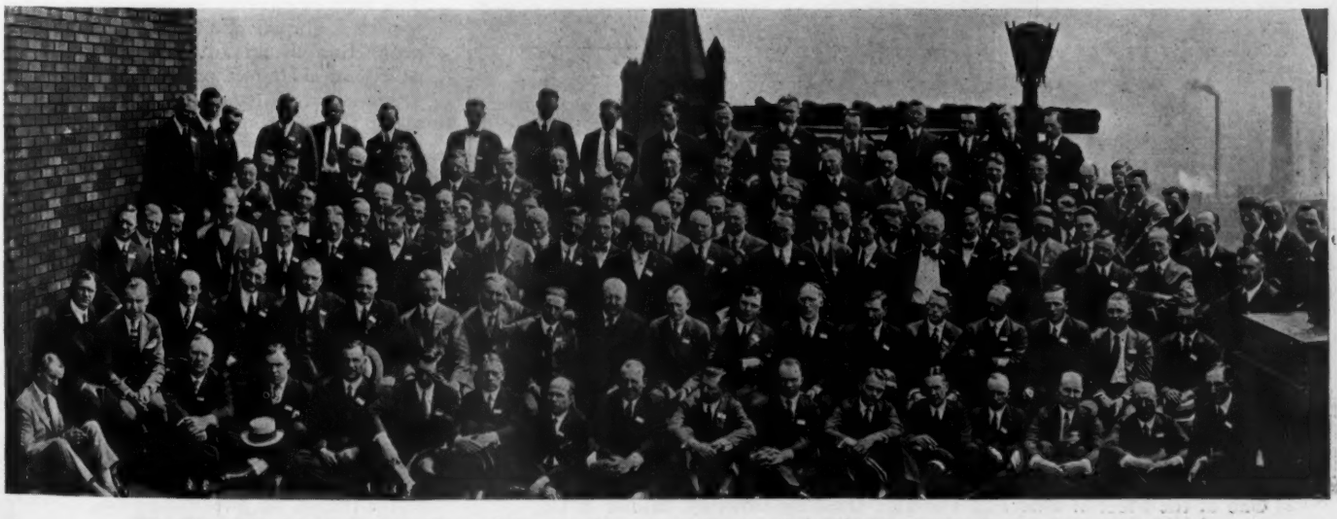
(n) Surplus parts may be returned only by individual arrangement with the manufacturer. All parts shipped to the manufacturer by dealer shall have transportation charges prepaid and be properly tagged.

The following five commonly neglected features of motor truck operation should be emphasized to the owner:

Lack of regular inspection.
Lack of intelligent lubrication.
Loose nuts and bolts.
Overloading.
Overspeeding.

It is impossible to over-emphasize the importance of these matters which are beyond the control of the manufacturer and which the user must recognize to be in the nature of an obligation on his part deserving of the most careful consideration, if successful operation is to be maintained.

The manufacturer provides an efficient machine capable of successful operation for a period of years but when the truck is installed the responsibility passes to the user, as in the case of any other practical utility which cannot be of infallible construction.



The Men Who Attended the Second Service Managers' Convention Held in Indianapolis, Ind., May 26th

Detroit Department Stores Build Up Big Suburban Business With Motor Trucks

Superb System of Concrete Roads Radiating From Detroit Make Possible Free Delivery of Goods to All Cities Within Radius of Thirty Miles. Big Future in Extending Delivery

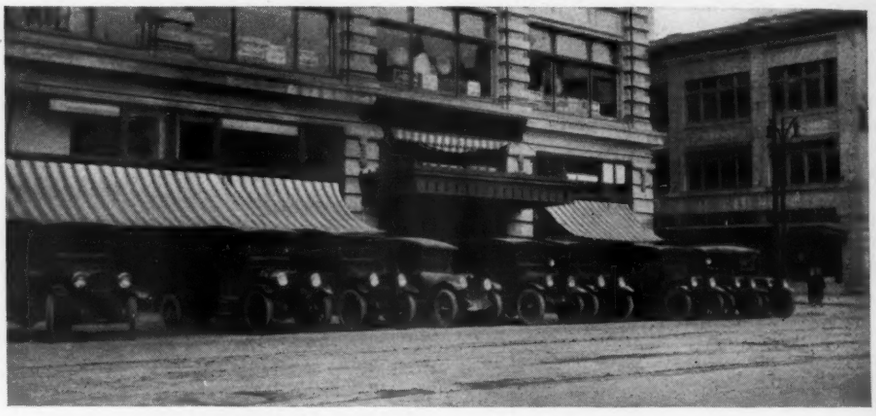
By A. V. COMINGS

HOW a well-planned, well-built system of concrete roads may be utilized in the extension of business by large retail stores, at the same time bringing to the small town dweller and the farmer practically the same shopping conveniences of big city folk, is wonderfully exemplified in the territory tributary to Detroit.

Motor trucks, of course, are the connecting link, and it is doubtful if anywhere else in the country there is as certain evidence of the all 'round benefit to all concerned of a rightly planned system of concrete roads. Big Detroit retail stores have been quick to appreciate the opportunity for expending their business with the rapid extension of concrete roads in all directions from the big city, and today the housewife or the business man in communities twenty-five or thirty miles away gets almost as prompt delivery service from Detroit's shopping district as the citizen who lives out on Jefferson, or Woodward, or any of Detroit's beautiful thoroughfares.

Within the limits of Wayne County, in which Detroit is situated, there are now over 200 miles of concrete road, and 25 miles more will be added this year. Thanks to a very able administration in the road-building department, at least, the roads have been built on a definite plan, with the result that there are through routes radiating from the city of Detroit in all directions to the more important towns and villages all over the county. Counties bordering Wayne have taken their cue from the success of the Wayne road builders, and have built connecting roads in many instances that prolong the broad, white routes out of Detroit into their own population centers.

Crowley, Milner & Co., one of Detroit's biggest department stores, was among the first to see the advantage of extending its delivery system to take in all the country within a wide radius of Detroit as fast as concrete roads made motor truck delivery economical, and so fast has it built up business through this plan of operation that a large fleet of trucks is now employed exclusively in this suburban work.



Fleet of Reo Speed Wagons at Crowley, Milner Store

Good Roads Produce Gain in Business

Starting with routes extending no farther than fifteen miles from Detroit, the work has gradually been extended till now practically all routes cover a round-trip mileage of approximately seventy miles. Three times a week on some of the routes, daily on others, the trucks make their trips with the regularity of express trains, and so satisfactory has this service been to people living in the outlying country that every route shows continual gain in business. Naturally, each new route proves a losing venture up to the time when people living along the route begin to realize the shopping service that is being placed at their command. Then business begins to build and soon the route becomes a really paying venture to the store.

One of the Fleet of One-Ton Federals Used by Crowley, Milner & Co. in Suburban Deliveries

Advertising the Motor Truck Service

In building up its suburban business Crowley, Milner & Co. have used newspaper space liberally in Detroit newspapers, and in the local newspaper along the routes. Big billboard space has also been utilized, and all has had its effect. The type of advertising used in the newspapers is shown in the accompanying reproduction of an advertisement that appeared in a Detroit paper. Note the suggestion that patrons "tell their neighbors" about the service. Needless to state, this has been one of the big factors in putting the out-of-town delivery service on the map.

The big stores do not confine their free delivery entirely to the thirty-mile radius, but will, if the purchase foots up a large enough figure, deliver by motor truck up to a hundred miles, if the roads are such that the trucks can economically make the haul. Crowley, Milner & Co. have made one delivery as far as Lima, Ohio, 125 miles away, but over a concrete road all the distance.

In hauling the miscellaneous purchases that emanate from a department store, the motor trucks, on pneumatic tires, or cushion wheels, have practically eliminated

breakage, and whereas in former times the damage to goods in transit by railway or electric express was a big factor in holding down sales, this is now practically a negligible quantity.

A Tip for Road Builders

It has been the aim of the Wayne county road commissioners, at least, to so build their roads that there would be none of the occasional rough spots found at railroad crossings, etc., which always are apt to mean spring or goods breakages in heavily loaded trucks. To this end, many railroad crossings have been laid in concrete, making the crossing quite as smooth as other portions of the highway. Also, the commissioners keep a repair gang on the job on each road all the time, so that ruts and chuck holes are unknown, and the roads are as good today as the day they were put down.

Crowley, Milner & Co. are using Federal trucks and Reo speed wagons principally in their city and rural delivery, the present fleet of 26 Federals being added to constantly. From 45 to 50 delivery cars are in use every day, a fleet that gives Detroit and outlying cities a complete service. H. C. Neverman is in charge of the delivery system.

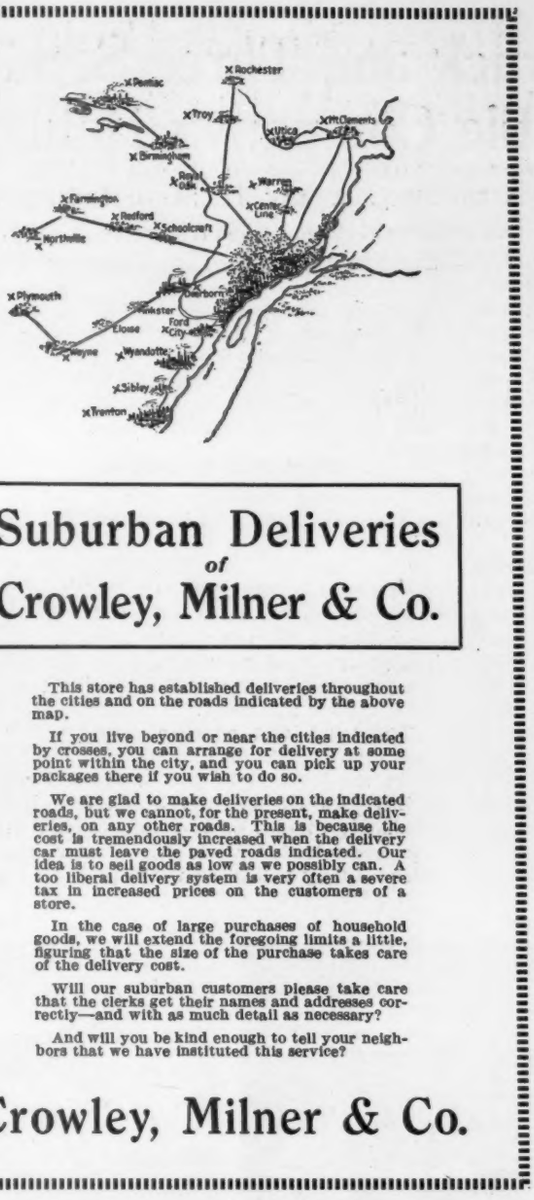
The J. L. Hudson Company is another of Detroit's big department stores which has found the concrete roads radiating from the city of great assistance in building up suburban business and this company maintains a daily schedule to the nearer points, and a tri-weekly service over a territory within a radius of thirty miles of their store. In addition, when business justifies it, special trips are put on to various towns and cities not on the regular routes. The Hudson Company's fleet is in charge of J. A. Henley, who was a prominent highway transport worker during the war, and consists principally of ¾-ton White trucks, on pneumatic tires.

Several other of the larger Detroit stores maintain service over Wayne county's concrete roads to their customers in various districts, and the success with which this type of delivery has met has established it firmly as a very definite part of the community life of every city within thirty miles of Detroit. The development of the high speed, pneumatic tired motor truck will extend this type of suburban delivery just as fast as concrete roads are built for the trucks to run on, and it would be folly to place any limit on what the development may amount to in the next few years.

Already, Wayne county's concrete roads are bearing motor truck traffic in volume far beyond predictions of only a few years ago, and the extension of the system finds traffic increasing in volume every day.

The motor truck dealer or distributor in other cities and other communities who has any doubts of the wisdom of a real system of concrete highways in his territory should study the system around Detroit, and aid in marshalling public sentiment in his own community to the end that the entire country eventually be net-worked with roads suitable for high-speed truck traffic.

This not only will increase the probability of truck sales in a given territory, but will also give the trucks in operation over such roads longer life and much greater satisfaction to the ultimate users.

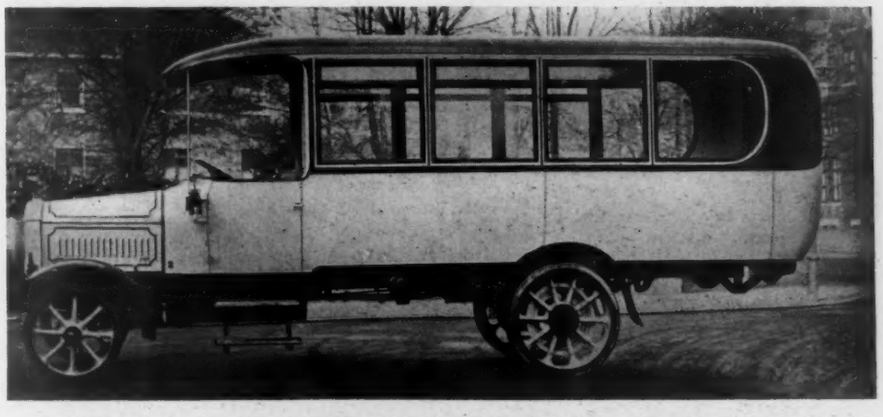

Suburban Deliveries
of
Crowley, Milner & Co.
This store has established deliveries throughout the cities and on the roads indicated by the above map.
If you live beyond or near the cities indicated by crosses, you can arrange for delivery at some point within the city, and you can pick up your packages there if you wish to do so.
We are glad to make deliveries on the indicated roads, but we cannot, for the present, make deliveries, on any other roads. This is because the cost is tremendously increased when the delivery car must leave the paved roads indicated. Our idea is to sell goods as low as we possibly can. A too liberal delivery system is very often a severe tax in increased prices on the customers of a store.
In the case of large purchases of household goods, we will extend the foregoing limits a little, figuring that the size of the purchase takes care of the delivery cost.
Will our suburban customers please take care that the clerks get their names and addresses correctly—and with as much detail as necessary?
And will you be kind enough to tell your neighbors that we have instituted this service?
Crowley, Milner & Co.

A Sample of Newspaper Advertising, Which Incidentally Brings the Road Problem to the Consumer's Attention

Des Moines to Have Truck Tours

Thoroughly satisfied with the results of their two motor truck tours among the farmers of Iowa last summer, Des Moines motor truck dealers are already planning several similar tours for the coming summer months. Don T. Chemberlin, who was tourmaster on the tours last year, has been named chairman of the tours committee of the truck dealers association, and dates and routes for the tours will be announced shortly.

High school boys will be employed during vacation this year at $4.50 per day by the State Highway Department of Pennsylvania.



The Private Automobile is Exercising Ever More Influence on the Design of the Observation Car and Omnibus in Great Britain

In this limousine type omnibus, built by Bartle on a Dennis chassis, we see this tendency very strongly marked

Tractor-Truck and Three Semi-Trailers Solve Mercantile Company's Haulage Problem

H. D. Lee, Kansas City Mercantile Company, Has Cut Haulage Costs to Figure Far Below What Had Previously Been Considered Economical by Using a Tractor and Trailers. Method of Operation and Cost of Outfit

USING a Pierce-Arrow five-ton tractor unit and three five-ton semi-trailers, the H. D. Lee Mercantile Co., of Kansas City, Mo., has cut hauling costs far below figures formerly considered the absolute minimum, and when the company adds a fourth trailer unit to this outfit, which will be entirely feasible and which is already planned for the near future, haulage costs are going to take another tumble.

The Lee Company conducts a wholesale business out of Kansas City in groceries, notions, etc., and the truck and trailer outfit is used exclusively on the grocery end of the business. As the haulage this outfit was designed to care for was between the main company building, warehouses and freight depots, removable bodies could not be considered, as they could not be left at the depots.

It was against real resistance from the company that a trial was finally arranged for the first tractor and trailer combination, and it didn't take long to show the company officials that there was a tremendous saving over their former methods of haulage in this new system. An order was placed immediately, three trailers were purchased in quick succession, and a fourth will be added soon.

Short-Haul Proposition

The average haul the outfit is used on is about 1½ miles, and is usually between the main building at Wyandotte and 20th streets, and one of the several freight depots over in "the bottoms." This means a long climb "over the hill," and then an easy descent down to the track levels. No brakes are used on the trailers, but the tractor brakes were made heavier than standard for this work.

The truck unit with an empty trailer backs up to the loading platform. The jacks are lowered by the driver and his helper, the tractor is released and immediately couples on to a full trailer that has been loaded while the tractor has been hauling a load to the depots.

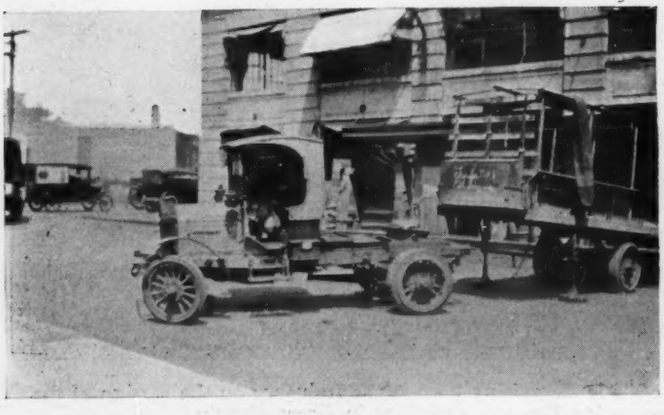
With the full load, which may run from seven to ten tons, the tractor starts out, and in a very short time has backed the load up to a freight house door, uncoupled, picked up an empty trailer left there some time before, and is on its way back to the warehouse.

But one driver is used at $35 per week, and one helper at $22.50 per week to each trailer. Each helper stays with his particular trailer, whether it be at the warehouse, en route or at the freight depot. He helps load and watches the checking at the freight station carefully, and is held responsible for his trailer at all times. This system has worked out very well indeed.

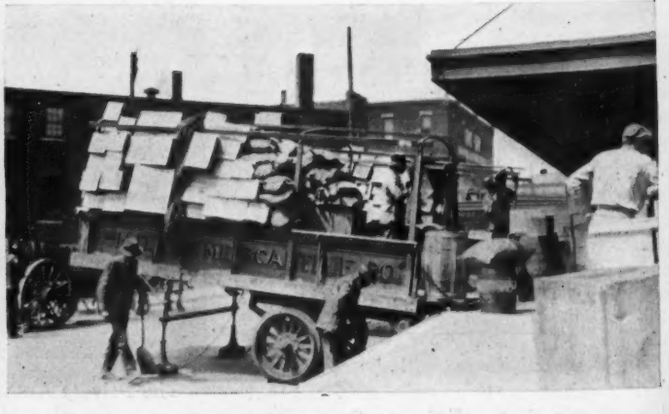
Approximately two hours is necessary to load each trailer, and the average is five loads hauled out each day with the three units. The company estimates that it would be necessary to have three five-ton trucks to handle this tonnage if trucks only were used, and had to stand idle

Backed Up With the Empty Trailer

The Trailer is Jacked Up From Tractor



The Tractor Leaves to Pick Up a Loaded Trailer

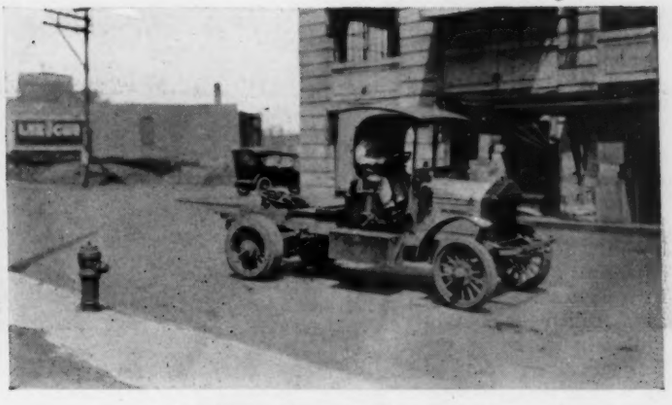


The Load is Put on While the Tractor is Busy Elsewhere

Picking Up the Loaded Trailer

Over the Hill to the Freight Sheds

Ready for Another Load.



Its Only Unproductive Time

during loading and unloading time at the ends of the route.

Provision for Future Contingencies

The outfit has now been in use 18 months, and there has never been a time when a substitute tractor unit has been necessary. If this occasion arises the company has plans all made for removing the body quickly from one of its other five-ton trucks, replacing it with the fifth wheel from the present tractor, and using it as a temporary tractor unit. This makes investment in another tractor unit unnecessary. The company, by the way, uses seven 2-ton Pierce-Arrow and one 2-ton Packard trucks in its city deliveries, and is thoroughly sold on the economy of motorized delivery.

Now as to the cost of this outfit. The tractor is listed by the Pierce-Arrow Company at $5500, and the three trailers at present prices would reach a total cost of $3330, making a total of $8830 for the complete outfit.

Average Cost Figures

Figuring depreciation, insurance, storage and all the minor charges according to the locality in which the outfit is used would show this a very cheap method of haulage under almost any conditions. In Kansas City the streets over which this outfit moves are all paved and mostly good, thus lowering this cost very materially. The tractor uses an overage of 12 gal. of gas per day, at 32c, and 7 pt. of oil per week.

The tires used on the tractor are Firestone solids, of the pressed-on channel type, 36 x 12, and on the trailers, 36 x 8, of the same make and type are used.

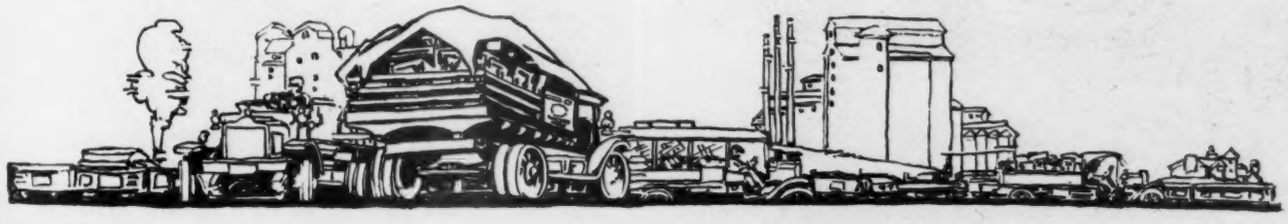
The bodies of the semi-trailers are heavily built, and are 15 ft. long and 5 ft. wide. The sides are 18 in. high, with a well-braced flare-board 10 in. wide. Four heavy stanchions on either side support rails over which a tarpaulin may be stretched in wet weather. The "tarp" is carried in a large box built on the forward end of the trailer, on the outside of the body.

Special Propping Jacks to be Used

While screw jacks of conventional type are used on the present equipment, these are to be replaced soon by a new type made by the Highway Trailer Company. The new jacks are operated by a crank on one side, one man operating both jacks. To compensate for different levels in the ground where the jacks rest, a clutch controlled by the operator, makes it possible to throw out either jack, so that either may be operated while the other is idle. The jacks are also hung in such a way that when released from their running position they automatically drop and are locked on their proper place. When through with them, the operator can easily swing them up into position below the body without assistance.

The value of the truck and semi-trailer on long hauls was shown recently during the railroad tie up, when the tractor and a trailer delivered a load of 17,500 lb. at Olathe, Kansas, slightly over 50 mi. away, over considerable road that was soft from recent rains.

The motor haulage outfit was installed and is under the direction of M. A. Gray, traffic manager of the Lee Company, and is under direct supervision of W. R. McCulley, superintendent of warehouses and shipping.—A. V. COMINGS.



Philadelphia's Educational Ship-by-Truck Tour Covers Three Hundred and Sixty Miles

Sixteen Trucks and Trailers Complete Tour Through Pennsylvania, Delaware and Maryland. Farmers and Small-Town Residents Were Taught Economy of Modern Method of Transportation.

By MARTIN J. KOITZSCH

THE motor truck tour staged and conducted by the Motor Truck Association of Philadelphia, one of the many scheduled for the national good roads week, May 17th to 22d, in which rural sections were visited by similar caravans of motor trucks to give practical demonstrations of the utility of truck transportation and teach the doctrine of better highways throughout the country, left eight o'clock on the morning of Monday, May 17th, at Broad and Callowhill Sts., Philadelphia, on a 363 mile tour. Five days later the caravan rolled back into Philadelphia, being enthusiastically received by a reception committee at 63d and Market Sts., the expedition having gone over its route absolutely on schedule time, over good roads and bad, completing a trip that will do more for the industry in every respect through the territory traversed than ever could have been accomplished thru any other single medium. Motorization of transportation and its allied movement the good roads doctrine were the messages transmitted to the city residents and to the dwellers of the territory lying south and southwest of Philadelphia.

Much local interest was inspired by the convincing speaking of Roland S. Cummins, who was the principal speaker throughout the trip, speaking at practically every stop, making short addresses, impressing upon those present the importance of the motor truck as a transportation unit not only on the farms but in the rural communities as well. Judging from the results already achieved, and from the enthusiastic comments of the participants, the tour was successful beyond the most hopeful expectations of those who made it possible. The trucks and trailers that made the tour are as follows: Graham, Packard, Keystone, Sterling, Trailmobile trailer, Grant, Rowe, Napoleon, Taylor, Troy Trailer, Miami trailer, Bethlehem, International and Firestone Tire Service.

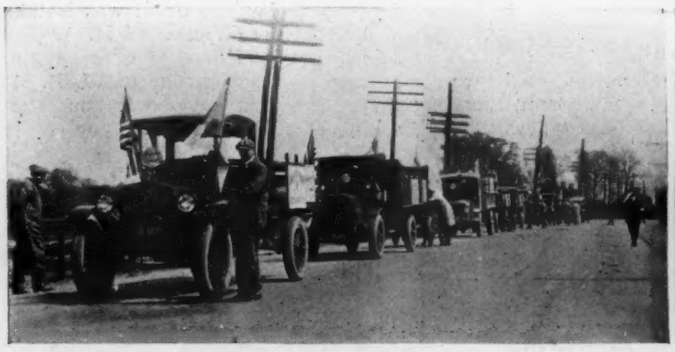
The trucks all were of two and a half tons or less capacity and equipped with pneumatic tires. An average speed of 15 miles per hour was maintained throughout the expedition. No individual advertising was permitted, nor were sales solicited. The tour was conducted on a purely educational basis.

The success of the tour was largely due to the efforts of the executives, A. S. Oswald, Jr., who was director general of the Truck Train, and who was assisted in handling the train by W. A. Sutherland, assistant director, J. H. Lyte, route director, and H. Hess.

Thorough preparation preceded the start of the truck train. H. M. Gallagher, who had charge of entertainment, spent considerable time and effort going over the route a few times before the day set for the start, making arrangements in each city and town for the coming of the caravan, selecting the hotels where accommodations could be secured and otherwise paving the way for the tour. The result was that the caravan and its personnel were well cared for at the various stopping places, and there was no hitch

Views Taken at Dwight Farms, Near Downingtown, Pa. The Y. M. C. A. Country Club, Located on a High Hill, Overlooking Miles of Farm Land

Upper: Packard truck and Troy trailer, the train leaders, rounding a sharp curve, the beginning of a steep, winding descent. Lower: Showing part of the caravan quartered for the night



A Halt Was Called on the Road Just Outside of Chester for the Usual Bunching Before Entering a Town

Mid-Afternoon Stop at Smyrna, Del. R. S. Cummins Addressed the Townsfolk From the Caravans' Platform

in the schedule of presenting programs and carrying out the other propaganda measures.

Advertised in Advance

A wide publicity campaign that was carried out prior to the starting of the tour had its effect, resulting in the turning out of the residents who gathered along the road and at the various stopping places to get an actual personal idea of what the motor truck will mean to them in future transportation matters. At these places much literature relative to highway transportation, motorization of the farm and ship-by-truck was distributed. Local newspapers contributed materially by bringing within the very homes of the farmers the announcement of events.

The expedition was cordially received at all points along the line. When possible, the caravan stopped at every village on the route, and if there was time a short program of speakers addressed the people congregated there.

Wilmington was the first stop, and the caravan arrived there in time for noon-day meal, arrangements having been made at the Du-Pont Hotel. The caravan had been received by the Wilmington Automobile Association and escorted to the hotel, where, when luncheon was concluded, the combined assembly was addressed by Mr. Cattell, Philadelphia's statistician, who was the principal speaker, and who outlined briefly, and with touches of humor, the importance of the truck in the present economic crisis and prophesized great things for the truck during this period. He bade the caravan God speed and the best of luck, and assured those who were sponsoring it that their sacrifice would result in untold, though presently unmanifested, benefits for the country and for the industry itself. W. S. Cummins addressed the audience on the purpose of the trip and gave a brief resume on general farm and rural transportation problems.

The tour director, A. S. Oswald, Jr., presided at this meeting, and in the majority of the following gatherings, where he usually outlined the purposes of the trip, what had been accomplished and pointed out to the people what the motor truck would mean to them in the future. He introduced the speakers.

R. L. Cummins, of the educational department of the Packard Motor Car Company, spoke every day on the reduction of transportation costs as one of the vital factors that would bring about a reduction in the high cost of living. He gave his hearers to understand that the conditions existing today were due partly to flagrant wastefulness, stating that every year millions of dollars' worth of fruit and perishable vegetables are allowed to go to waste; either on a farm, due to the inability of the farmer to market them, or on the way to market because of innumerable delays in transit. This waste, he said, creates a scarcity of all-important foodstuffs, and at the same time is a heavy loss to the producer; all of which can now be overcome and is fast recognized by the farmers through the addition of a reliable motor truck to their present line of farm equipment. In many other ways he gave the inhabitants of the various districts something to think about in his addresses on motor trucks.

Some of the Tour Officials and Guests

Left to right: A. S. Oswald, tour director; C. C. Bulkeley, J. Workman, W. A. Sutherland, assistant tour director, and H. M. Gallagher, entertainment, who is holding the last half dollar in the treasury

Punctual From the Start

The tour director gave the signal to start at eight o'clock Monday morning at Broad and Callowhill Sts., where the trucks were mobilized and the caravan rolled off down Broad St. with a great blare of the automobile horns toward Chester, the first stop on the itinerary.

A passenger car containing H. M. Gallagher on entertainment, and J. H. Lyte, route director, and two other passenger cars, filled with press men, guests, etc., followed.

Synopsis of Itinerary

The entries into successive villages, towns and cities were perforce, more or less similar, yet those who accompanied the caravan retain the impression of the individuality of each welcome.

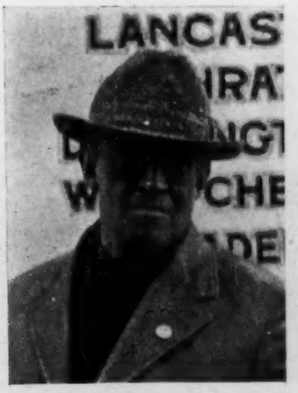
The Caravan passed through Chester, Wilmington, Smyrna and Dover the first day, receiving at Dover the first exhibition of real intensive interest on the part of the people. On Tuesday morning at 8 o'clock the caravan continued, passing through Magnolia, Fredricka, Milford, Georgetown and Seaforth; Wednesday through Seaford, Ridgeville, Harrington, Dover, Middletown, Newark. Newark was left behind Thursday morning, the caravan passing through Rising Sun, Maryland and Quarryville, Pa. At Quarryville the Philadelphians were met by the Automobile Trade Association of Lancaster, and a big demonstration was held, which included as speakers Mr. L. F. McAllister, who is a member of the Lancaster city council, and chairman of the good roads committee for the Pennsylvania T. P. A.; G. W. Ranck, president of the Lancaster Automobile Trade Association; Edward S. Gable, and other prominent representatives of the community. The meeting was held in the center of the town, and speeches were made by the local representatives as well as by the tour officials.

Leaving Lancaster the following morning, the caravan arrived at Lititz, where they were warmly received by the townsfolk. The Lancaster Trade Association took complete charge of activities while in their home county. The meeting was preceded by a little singing led by one of the Lancaster men, and was followed by an interesting address by H. C. Hess.

Ephrata was the dinner stop on Fri-

Tour director, A. S. Oswald, of the Traylor Engineering and Manufacturing Co.

R. S. Cummins, of the Packard Company, was the tour's right-hand speaker.



Route director, J. H. Lyte, of the A. R. Miller Company, representing the Troy and Miami trailers.

"Smiling" H. M. Gallagher, a Firestone man, who saw that no one wanted.

day, and the tourists were given a real surprise by an exceptional layout prepared by the committee on entertainment.

After leaving Honey Brook, Downingtown, quarters were secured on the Dwight Farms, a Y. M. C. A. camp located on a high hill, from which prominence a panoramic view over miles of farm country could be seen. The trucks performed remarkably in climbing to the summit, over a rough winding wagon trail having many very steep grades. Here the boys obtained a reprieve from the past strenuous days, having a general good time on the grounds of the country club provided with innumerable pleasant attractions.

The following morning Dowingtown was left behind, the caravan entering West Chester, where a meeting was called before re-entering Philadelphia.

One regrettable feature of the tour was the total absence of practical demonstrations, something that would have concretely brought home to the farmer the enormous saving of time possible, through the utilization of motor transportation over the old-time horse and team method. A farmer will always be more receptive to something you show him instead of being told merely of past performances and given theoretical facts and possibilities. However, considering this rather serious and somewhat inexcusable omission, the tour as conducted undoubtedly will prove of considerable value from an educational and propaganda standpoint in the territory covered, especially since this was the first event of this kind conducted through these regions. It is to be hoped that the next tour staged will make provision for these demonstrations, in addition to motion pictures to round out evening meetings, as this increases the effectiveness and value of a crusade.

Motor Truck Terminal for Indianapolis

INDIANAPOLIS motor car dealers, together with tire men and oil men, have joined with motor truck owners, rural motor express men and others in the formation of the Indiana Highways Transport Association, capitalized at $100,000, headquarters, Indianapolis, to put the motor truck and highways transport on an intelligent basis.

The first thing this association did in a concrete may was to procure the C. I. & W. freight station as a central shipping station for motor trucks, where motor trucks running to or from Indianapolis could leave their incoming load and get their outgoing load, systematizing motor truck loads from city to city or from the rural district to urban centers.

The dealers are interested in this movement for the reason that organized effort for motor truck transportation with the betterment of the roads, the education of the shippers, receivers and consumers, as to the social benefits of the motor truck, should lead to a better distribution of motor trucks and a wider use of the motor truck for transportation purposes.

However, it cannot be said that the motor truck dealers were the originators of the plan. Other Indianapolis business men were—shippers who saw the futility of the railroads and electric lines to serve the transportation needs of Indianapolis, with their terminal facilities overcrowded and heavily handicapped during the unauthorized switchman's strike in April, men who had not been too friendly to motor truck transportation, saw that it was necessary to further the motor truck as a carrier.

A conference of all men interested in the motor truck was called, and out of this conference grew the Indiana Highways Transport Association.

Roy Adams was elected president of the association. Mr. Adams lately retired as president of the Hoosier Motor Club. He is interested in the building of better roads.

The vice-president is Lewis Taylor, who is president of the Indiana Federation of Farmers and interested in the motor truck as it serves the farm. The secretary is Tom Snyder, secretary of the Indiana Transfer and Warehousemen's Association. The treasurer is C. W. Abrahams, all of these officers are of Indianapolis.

Indianapolis is thus among the first of the cities to establish a terminal point where motor truck shipments may be "cleared." The building obtained which will serve until a proposed new warehouse is constructed is 40 by 100 feet, with a platform of 2500 square feet.

The question of the rates established is an all-important one. The rates established were made after the whole matter had been threshed out by the shippers, the motor truck owners in rural motor express routes and the motor truck dealers.

It was the consensus of them all that the rates established should be such as to afford a profit to the truckman, that the whole motor truck movement had been given severe jolts by men who knew nothing of costs and consequently nothing of rates that should be established. In many cases, the rural motor express route failed, the truck went back to the dealer as a used vehicle, the community lost that transportation service.

Now it is felt that while the rates established are high, they are none too high, measured by the additional service. They are so high, however, that with better organization of the express routes and more return loads, the rates can be reduced from time to time as costs are reduced.

The following schedule of rates have been established:

Formula	Hauling charge	Terminal charge
One to ten miles	3c per mile	2c
Ten to 25 miles	2c per mile	2c
25 to 50 miles	1¾c per mile	2c
More than 50 miles	1½c per mile	2c

Household goods and articles classified higher than first class in the official steam road classification to be charged for at double the rates named. The minimum charge for hauling is to be 75 cents.

To put this idea of motor truck transportation across in Indiana, it is recognized that a big campaign of education is necessary. The merchants of Indiana and the consuming public will be taught all the benefits of this motor truck transportation.

A record department will be maintained, with data on tonnage hauled; unit used; distance covered; operating costs; road conditions; distribution problems; commodities classified—all for the benefit of the men interested anywhere in the problems of highway transportation, particularly for other organizations which may seek to gather the same date later.

The insurance rate of 5 cents per $100 has been adopted, which is a part of the rates named.

Indianapolis shippers, with the establishment of this motor truck service, and with its perfect working out, seek to get away from the burdens they have suffered because of limited terminal facilities and the delays and losses at the other freight terminals.

These losses have not been a small item in Indianapolis where delays at one electric railway station in one year was computed to be $200,000. In the steam freight yards of Indianapolis, from 3500 to 5000 freight cars, according to figures claimed, are constantly awaiting limited terminal facilities.

Freight Depot Now Utilized as Shipping Station for Motor Truck.

This abandoned freight depot of the C. I. & W. is now to take a new lease on life as a clearing house for motor truck freight going and coming from Indianapolis.

Hub Standardization for Wheels and Axles

CORNELIUS T. MYERS, Consulting Engineer

FOR the past year considerable thought has been given to the subject of standardizing axle hub designs, so that the large number of variations of dimensions no win existence can be materially reduced, to the evidently great advantage of all branches of automobile and motor truck industry. Some particularly active work has been done in the past four or five months, and more or less publicity has been given to the subject. The discussion of this hub standardization very properly embraces passenger car and motor truck practice in all sizes, covering not only trucks equipped with solid tires, but also the constantly increasing number of trucks equipped with pneumatic tires. It has been estimated, after careful study, that actually millions of dollars are being wasted annually because of the large number of small differences in hub dimensions for various sizes of passenger cars and commercial vehicles. Besides the actual waste in dollars and cents, the amount of time and attention wasted in connection with this multiplicity of dimensions could be materially reduced and a great amount of energy and patience conserved to better use.

In approaching this problem of standardization we find that to undertake a program that covers the entire field would involve not only an enormous amount of work, but would take a long time to accomplish. Let us eliminate the passenger car problem for the time being and consider only the commercial car.

In the development of the motor truck industry the number of front and rear axle designs has become quite a large one. Each truck manufacturer who built his own axles used individual judgment and preference as to wheel hub details for each size and type of axle. In reviewing the situation today we find that it takes well over 250 different wheel designs to match up with the various axle hub designs and sizes for trucks having a total of 10 different load ratings, ranging from ¾ ton to 7½ tons. With the exception of the ¾-ton truck, this number of different wheel designs covers only solid tire equipment.

While it is quite natural that these conditions should exist, it is a condition which the motor truck industry can hardly view with complacency. The large number of trucks using these various sizes and the amount of money invested in jigs and tools by the axle and hub manufacturers for producing these sizes offer, of course, considerable resistance to any change.

Now that the pneumatic tire for motor truck use calls for practically 50 per cent increase in the number of wheel designs, it will be well worth while to look over this field and see what possibilities of standardization exist. By confining ourselves to front axles for commercial cars operating on pneumatic tires, we can limit our attention to a comparatively small field. This can be still further limited by first considering the standardization of axle hubs for wood wheels.

The accompanying table outlines some suggestions for standardization for front axle hubs of motor trucks using pneumatic equipment.

SUGGESTED STANDARDS FOR MOTOR TRUCK HUB DESIGN

1	2	3	4	5	6	7	8	9	10	11	12
	No. OF SPOKES	SPOKE THICKNESS	HUB BORES	FLANGE DIAM.	No. & DIAM OF BOLTS		No. OF SPOKES	SPOKE THICKNESS	ALTERNATE HUB BORES	ALTERNATE FLANGE DIAM.	No. & DIAM OF BOLTS
PNEU. ¾ TON FRONT	12	1⅜"	4"	8"	6-7/16"	PNEU. ¾ TON REAR	12	1¾"	3"	4¾"	8"	10"	12-7/16"
PNEU. 1-TON FRONT	12	1½"	4¼"	8¾"	6-7/16"	PNEU. 1-TON REAR	12	2"	3½"	5"	8"	10"	12-7/16"
SOLID 1½ TON FRONT	12	2"	4⅝"	9¼"	12-7/16"	SOLID 1½ TON REAR	12	2¼"	4"	5¼"	9"	10½"	12-7/16"
SOLID 2½ TON FRONT	12	2¼"	.5"	10"	12-7/16"	SOLID 2½ TON REAR	14	2½"	4"	5¾"	10"	11½"	14-½"
SOLID 3½ TON FRONT	14	2½"	5½"	11"	14-½"	SOLID 3½ TON REAR	14	3"	4½"	7⅛"	12"	13"	14-½"
SOLID 5-TON FRONT	14	3"	5¾"	12"	14-½"	SOLID 5-TON REAR	16	4"	5"	7½"	13½"	14¾"	16-⅝"

Tire and rim standardization has already been accomplished to a large extent. The rim size will determine the wheel felloe size and, in a measure, the spoke size. Spoke sizes have been carefully considered with respect to the loads which they have to carry.

Spoke sizes, number of spokes, bore for the hub, the diameter of the outside of the spoke mitre and size of hub bolts all have an intimate bearing on hub design. The tabulation sets forth suggestions for standard practice in this respect.

Steel wheels of various types demand a further and full consideration. They are being used in increasing numbers, and the hubless types (which seem more popular) should, if possible, interchange with wood wheel sizes, or be adaptable with slight modification. If this cannot be accomplished another set of standards for steel wheels should be considered, so as to minimize the expense in the development of these wheels, and enable the industry to use them when desired.

Doubtless many compromises in hub design are also possible, on axles for solid tired trucks. Suggestions for standard practice should be drawn up so that they will be followed in the new designs, even if manufacturers do not at once do what they can to have their present production conform to them.

The writer has been in touch with practically every manufacturer of axles for motor trucks, and the attitude of the vast majority is that of co-operation. Quite a few designs are either about to be put on the market or are in the course of consideration. Some redesigning is undoubtedly contemplated. The subject is of such importance that undoubtedly all parties will co-operate in its advancement to the great benefit of the industry. It is not at all necessary that this be done hurriedly; in fact, careful consideration must be given to all phases of the question, but time should not be allowed to pass without continual progress being made toward the solution of the problem.

Rapid Growth Characterizes Southern Truck Lines

Since the completion of a central freight depot and the purchase of three large, well-established motor truck lines by the Union Transportation Line of Louisville, Ky., this company is claimed to be one of the best equipped highway transport organizations in the country.

This company, incorporated at $100,000, began operations only six months ago. Its development came as a result of the public's recognition of its value as an adjunct to other transportation agencies where they exist, and the fulfillment of a long-felt need where other agencies do not exist. That the public has an active interest in the welfare of the new mode of transport is best evidenced by the fact that it has invested its money.

The company, when founded, planned to establish seven main and 47 secondary routes, covering 136 towns, all within a radius of 75 miles of Louisville. Five of these main routes are now in operation The company now owns more than 20 trucks, which carry to the small inland towns all the merchandise made, distributed, or sold in Louisville and bring back to the city merchants' livestock, grain, green groceries, and all other farm products. This service has been the means of saving shippers money by decreasing the time of delivery. Time and door-to-door service is rendered.

The Retail Truck Dealer's Cost of Doing Business*

By ROBERT O. PATTEN, Manager Truck Sales, Pierce-Arrow Motor Car Company, Buffalo, N. Y.

WE hear a great deal nowadays about the high costs of living. It seems as though all the writers of the day are taking their fling at this very popular topic, and the public are being stuffed with all sorts of cures, none of which appear to be entirely effective. But going on the theory that intelligent agitation will eventually cause an improvement, we should all of us be appreciative of the efforts being made.

Those of us who are engaged in the motor truck business as makers or dealers are facing the general problems that confront the public. * * * The retailer of motor trucks more than ever is worrying about his increasing sales, service and overhead costs. He states that his profits are nowhere near as large as in the past, and that with present conditions confronting him, they are more and more rapidly diminishing. The retailer's solution to this problem to him is very simple, viz.: greater discounts from the manufacturer. The manufacturer, however, flatly denies that a greater discount is the logical help needed, and answers that he, too, is confronted with constantly increasing labor, material and overhead costs, and that greater discounts will simply be a matter of adding to list prices, thus handicapping marketing conditions and decreasing volume of production, and merely attempting to discount an evil day sure to come. * * *

Experience is available to show all truck makers that buyers are not easily converted to price increases, and that very real justification must be available before price increases are put into effect. The giving of a greater discount to dealers should not be the main reason for a truck to sell for more money. This reason, when advanced, would be answered by the intelligent buyer in no uncertain terms. And it cannot be a hidden fact, either.

Assisting the Dealer

No one at this brilliant gathering of sales executives of a great industry but who would not indignantly deny any unwillingness to assist the dealers in mapping out a course of procedure for doing business. But how many among us honestly have followed this procedure. How many of us have laid out a real dealers' policy, which treats with marketing, financing and servicing motor trucks. To those of us who have neglected this work, my suggestion is that this matter be given immediate consideration. The signing of an agency contract, the taking of a money deposit, and the allotment of a certain number of models, **does not mean the ending of the transaction.** The factory can reasonably assume what its expenses and profits may be, but how about the dealer? Unless he is placed in the profit-making class, the relation is unsatisfactory and short-lived.

It is interesting to sit in a conference of dealers and listen to their experiences, and how they handle this problem, and how that difficulty is overcome. They seem to be drifting so far as fundamentals are concerned, and each has a different idea of what should be the proper ethics. The worst part of it all is, the dealer is not always to blame, for he is left to work out his own salvation upon his own resources, and has done the best he could. * * * They are grateful for assistance that will legitimately increase their profits, which many times can be done without expense to the factory or the customer. There can be no possible objection to co-operative plans, and every good can be obtained.

Employing the Proper Type Salesman

As each dealer's business grows, he finds himself unable to sufficiently multiply his individual efforts to cover his field, particularly as regards actual retail sales. Many dealers have built their business upon their personality, and suddenly discover that individual operation must be organized. The selection and employment of retail salesmen is a subject upon which much time might be devoted. We all know that all our dealers spend large sums of money in paying men who prove unproductive. This sales expense, without result, is a most important consideration. Your dealers are working on a percentage basis. They should be advised to employ their salesmen on a basis of compensation which has as its fundamental a certain fixed percentage. This may be a bonus, drawing account, commission, or any other form of handling, but all dealers should have a budget system for sales compensation. The dealers' business is essentially a sales proposition paid proportionate to results obtained. Nothing could be fairer than to place the individual salesman on the same basis.

Permit me to illustrate in a practical way efficiency of forethought in finance. One dealer makes his financing plans for the spring well back in the winter when money interest rates were more favorable. Another dealer waits until carload shipments with factory drafts arrive, and is obliged to pay a higher premium for money. The difference of 2 per cent or 3 per cent on each dollar represents efficiency in forethought. Take shop work, which represents another angle. One dealer carefully plans his work in advance, taking into the shop such work as he can handle by keeping his force uniformly busy. The opposite is he who has the shop crowded beyond capacity one week, and the next there are many idle hours, unproductive to employer and truck owner. Lacking a more convenient outlet, many times this wasteful neglect of business planning is charged to so-called overhead—it is really waste. Think it over. These situations are familiar to all of our dealers, and our education of them will be mighty helpful and appreciated.

Comparative Figures Vital

Some dealers (and factories, too, for that matter) may think they are making money, when they are really losing it. And it is not always a matter of bookkeeping either. It is always mighty interesting to know when a profit is had and a loss is made. Right here I want to say that to me comparative figures, struck from the same basis, are vitally interesting. Therefore, I want to suggest, as a practical means of arriving at a true result, that the manufacturers should urge each dealer to use the same system of accounts, the same items in each instance being chargeable to the same account, and that a quarterly audit of the dealer's affairs be made, forwarded to the factory for analysis by the treasurer, and the dealers called in for a conference. It does not take long for that dealer who is below the average to realize his shortcomings, and begin to take up the slack.

One motor truck corporation has shown great interest in the bookkeeping end of its dealers' business, and some remarkable results were shown. They feel this to be quite an important part of their business, for to keep the interest of the dealer, he must make money, and for him to make money, he must be made to realize into what branches of his business each cent of a dollar goes. Not long ago eleven great Metropolitan agencies were audited. These represented different sections of the country, selling various sizes and types of trucks. The dealers were called into conference and various charts displayed. One chart showed the earnings or losses of the service station department, when the average net profit was 9.60, against a total expense of 18.12. The sales department was next exhibited, and a comparison made between selling expense and general expense. The average selling expense was 6.88, and the general expense 4.79. And next came the net profits as an average, and each shown individually.

As a factory and its product grows in strength and reputation, the dealers' organization should keep pace. This can best be done by an organization between the factory and its dealers, an organization of co-operation, whose problems are mutual, and whose object is to help one accomplish anything. But factory plus dealer will overcome mountains of obstacles.

*Extracts of paper read at March meeting of the National Association of Motor Truck Sales Managers.

EDITORIALS

Dealers Should Protest Against Stoppage of Highway Work

ACCORDING to a notice sent out by The Portland Cement Association, the Association of Railway Executives intends to urge the Interstate Commerce Commission to refuse cars and transportation for road building materials. The reason given for this proposed action is that the labor and materials required are to be diverted to the needs of the railroads.

Road building is one of the many things which must be continued at this time and for years to come without any curtailment or handicap. Within the past few years our highway programs were seriously curtailed, but such discrimination, as proposed, should not now be tolerated, particularly because of the serious or impending food shortage, and also because of the relief which highway transportation has given to industry in handling the traffic which the railroads could not take. If highway construction can continue in a vigorous manner, many of the roads now under construction will be finished in time to afford greater relief to the railways and to meet the greater demands which will undoubtedly be made of them in the future.

Every dealer and manufacturer should interest himself in seeing that our highway programs are pushed to completion. Emphatic protest should be made to the Railway Executives Association, 61 Broadway, New York, to the Interstate Commerce Commission, Washington, D. C., and to the President of the American Railway Association, Washington, D. C., against any further obstacles to highway constructions.

Don't Knock the Truck

IT is to be regretted that the general public takes the attitude that motor trucks are responsible for the damage done to some of our main highways, but when passenger car dealers and their salesmen talk along these lines it is time to call a halt. Many passenger car dealers have gotten into the habit, unconsciously perhaps, of roasting the truck as to its road-damaging qualifications. It is not our purpose to here dwell upon the condition of our roads and the inability of some of these roads to stand up under heavy traffic, but we do think that it is not doing the industry or the dealer any good, especially if he handles passenger cars and trucks, to permit his passenger car salesman to condemn the truck as a road destroyer. That same individual who criticises the truck is probably the last one to do his part in trying to bring about better road conditions. Our roads must be built and rebuilt to take care of the heavier and increased traffic which is bound to come, and our dealers and manufacturers must make it their business to fight any propaganda which is detrimental to the advance and progress of the industry. If you can't boost for good roads, don't knock the truck.

Regarding the Fuel Situation

TODAY, America is using more crude oil than it produces. This is clearly shown by the figures given out by the United States Geological Survey and the oil refiners, and we have no reason to doubt the accuracy of these figures. And we have it from Sir S. Mackay Edgar, head of the London banking house of Sperling & Co., that this country is using up its supply of oil indiscriminately, and which, if properly conserved, should have lasted at least a century and a half. He also states, that more oil has run to waste in the United States than ever reached the refineries. Within ten years, he states, this country will be forced to buy fully five hundred million barrels of oil a year from Great Britain. (We hope not.) We could go on and enumerate a great many other conditions which would all go to show that the shortage is not a myth but an actuality which the automotive industry must now consider more seriously.

We have, of course, other fuels which might be used, such as alcohol. But until this fuel can be produced in quantities at a price comparing favorably with that of gasoline, and until this fuel can be made in every part of the country and proper legislation effected which will not over tax such an industry, this fuel is still in the offing. We also have our shale deposits which will yield gasoline, but the expense of refining is too great at the present time. Shale deposits are the mecca for a great many stock-selling oil companies at this time —that's about all.

The present supply can be conserved, either by rationing it to the consumer or by a big increase in price. Neither plan would be welcomed by the trade. In fact, they are not needed. What we do need is a more intelligent use of the future production. There is a tremendous quantity of gasoline

wasted every day on account of bad roads; too many trucks are fitted with carburetors that are not as efficient as others which cost a little more; there are not enough starting and lighting systems used in the truck field and other devices which tend to increase the mileage per gallon.

The manufacturers of automotive products must get together to devise ways and means for stopping the unnecessary use of gasoline, otherwise the price will mount higher and higher, with the result that the motor truck industry will suffer in consequence. This is one problem which the industry cannot sidestep.

Manufacturers Must Assist in Standardization Work

THAT standardization is for the good of the industry in general cannot be disputed. Were it not for standardization, the automotive industry would not have become in so short a time the third largest industry in the country. We are not yet done with standardization work. There are still many parts of a passenger car and motor truck which requires standardizing in order that cost of manufacturing may be cut down and useless work eliminated. One of these parts on which work has now started in earnest is the standardization of wheel hubs.

This work cannot be carried on, however, in any systematic manner or with any degree of dispatch, unless all manufacturers interested in this problem give their hearty support and serious attention to it. The most discouraging phase of any standardization committees job is the lack of interest displayed by the manufacturer and the holding up of the work by his not forwarding the necessary data required promptly. It is to be hoped that the manufacturers who will be called upon to answer the questionaire which was sent out recently by the committee appointed during the conference held in Atlantic City for the purpose of standardizing wheel hubs will give this matter their prompt and earnest attention.

Syracuse Dealers Organize Permanent Motor Truck Association

SYRACUSE, June 2.—Those motor truck dealers of this city who participated in the tour through the New York farm lands during the week of May 17-24, and other truck dealers, held a banquet last evening at the Yates Hotel and celebrated the event.

Those familiar with truck tours in agricultural sections say that this tour did more to convince the farmer as to the economy and practicability of the truck than any tour they have attended. All of the committee, speakers and dealers, worked hard to make it a success, and, best of all, no one had an axe to grind.

Following the banquet a meeting was held and the temporary organization formed just previous to the tour was made a permanent one. C. W. Darling was elected president, H. Bancroft White, vice-president, and John Barzee, secretary and treasurer. An executive board will be appointed at a later meeting.

The organization will be known as the Syracuse Motor Truck Dealers' Association, and it has as its object the correction of trade abuses, promotion of motor highway transportation, good roads and sane legislation. It proposes to hold another truck tour probably next spring.

The decision of the dealers to form an organization closely follows the invitation of the passenger car dealers' association to join the latter as a division. This step was not deemed logical or practical by the truck dealers, as it is believed that better results will be obtained by a truck association working independently. Membership is extended to all legitimate truck dealers in the city, and at the present time the membership list is very gratifying to the association. Rooms have been secured at the Yates Hotel, and among the plans suggested is weekly luncheons which will afford the members an opportunity to become better acquainted as well as discuss subjects of timely interest.

Among the plans discussed informally was that of co-operating with truck associations in other cities in the State in combatting adverse legislation. It was suggested that in this manner the expense of fighting adverse legislation would be greatly reduced, and that better results would be obtained through an organization; that is, a committee representing the various associations.

Goodyear Issues Thirty Million Dollars New Stock

The Goodyear Tire & Rubber Co., Akron, Ohio, offers its stockholders $30,000,000 of additional stock in order to finance its business expansion. The new stock has $20,000,000 7 per cent cumulative preferred, and $10,000,000 of common stock.

This sale, together with the 150 per cent common stock dividend recently declared, will increase the common outstanding stock from $20,775,500 to $61,918,750, and the preferred will be increased from $46,668,500 to $66,668,500.

A letter from the company to stockholders says: "The business of the company up to May 1, 1920, has exceeded the business of the preceding year for the same period by 59.3 per cent. By reason of general business conditions the company has been compelled to carry a much larger supply of materials of all kinds than under normal conditions.

Automotive Industry Reduced to Seventy-Five Per Cent Output

Leaders of the automotive industry at the sessions of the annual meeting of the National Automobile Chamber of Commerce recently concluded in New York pointed out that as a result of uncertain receipts of raw materials at the factories, because of inadequate freight service, production has fallen off in the last six weeks, and as a whole manufacturers are now on a seventy-five per cent output basis.

In May 68,000 passenger cars and trucks were delivered over the highways from factories to dealers. Previous record for driveaways was 61,000 in April.

Reports from various parts of the country indicate an expanding demand for trucks, which are being rushed into service to relieve transportation congestion.

The annual election of officers resulted in the return to the office of president of Colonel Charles Clifton, chairman of the Pierce-Arrow Motor Car Company; Roy D. Chapin, Hudson Motor Car Company, was elected vice-president; C. C. Hanch, Maxwell Motor Company, second vice-president, passenger car division; Windsor T. White, the White Motor Company, vice-president, motor truck division; A. J. Brosseau, International Motor Company, secretary, and H. H. Rice, General Motors Truck Company, treasurer.

The new directors elected were as follows: Charles Clifton, Pierce; Windsor T. White, White; Horace E. Dodge, Dodge; Harry M. Jewett, Paige, and W. C. Sills, Chevrolet.

Dates selected for the 1920 shows: January 8 to 15 at Grand Central Palace, New York, and January 29 to February 4 at the Coliseum, Chicago.

News of the Trade in Brief

(For Factory Items, Personals, New Incorporations, Etc., See Pages 104-110)

No National Truck Show Next Year

Automobile show dates for 1921 were fixed and the advisability of conducting a similar truck show was discussed and decided upon at the annual meeting of the National Automobile Chamber of Commerce held in the Commodore Hotel on the 3d and 4th of June.

Contrary to expectation, the motor truck manufacturers decided to hold no show this season. The time was regarded as too short to arrange a comprehensive exhibition and the motor truck committee of the Chamber will work out a plan for a complete demonstration of motor truck utility and service which may be held next spring.

Passenger show dates for 1921 were fixed for the week of January 8th to 15th in New York at the Grand Central Palace, and from January 29th to February 4th in Chicago at the Coliseum.

President Charles Clifton, of Buffalo, was re-elected for another year. Roy D. Chapin and C. C. Hanch were elected vice-president and Windsor T. White vice-president of the Motor Truck Division. A. J. Brosseau was elected secretary, and H. H. Rice, treasurer.

Solids and Pneumatics on Trucks

Should heavy trucks be equipped with solid or with pneumatics is the question that both owners and engineers are trying to decide today. Opinion may perhaps be characterized as composite at the present time with accepted conclusions that pneumatics on trucks up to 1½-ton capacity, and solids on trucks of 3½ tons is safely practical and economical for certain uses. Choice cannot be made intelligently without a careful study of the different factors of individual equipment. Speed increase, due to the substitution of pneumatics on a truck already solid tired can be taken care of by governing the engine. Vibration and braking are also problems when tire changes are made. Short radius turns, if required, must also be considered, as the solid tires afford the shorter radius turn. Operators and buyers should obtain factory advice before changing tire equipment.

Railroad President Approves Trucks

W. G. Besler, president of the Central Railroad of New Jersey, in a letter to F. W. Fenn, manager of the motor truck division of the N. A. C. C., says:

"There can be no question in the mind of any one concerning the important part the motor truck has come to play in the matter of transportation in this country, nor that it has come to stay and to supplement railroad service just as the automobile and trolley car have supplemented and extended the radius of suburban life.

"The auto truck for intra-city movement and for inter-suburban service will fill a much-needed gap and will do more economically and efficiently the less than carload lot business which has been forced upon the railroads and must be handled through transfer houses."

Coming Events

August 23 to 28, 1920—Stillwater, Okla. Oklahoma Farm Power Show, under direction State Board of Agriculture.

September 6 to 11, 1920—Indianapolis, Ind., Annual Fall Auto Show, at State Fair Grounds. Passenger cars, trucks, accessories, only. John B. Orman, Manager, 338 North Delaware Ave., Indianapolis.

October 6 to 8, 1920—Northampton, Mass. Annual Automobile Show, H. F. of H. Agricultural Society, Three-County Fair Grounds. A. J. Morse, Secy.

October 6 to 16, 1920—New York. New York Electrical Exposition, three floors, Grand Central Palace, includes Electric Passenger Cars, Trucks, Industrial Trucks, Batteries. George F. Parker, Mgr., 124 West 42nd St.

November 1 to 6, 1920—Jersey City, N. J., Annual Show, Hudson County Auto Dealers' Association, 4th Regiment Armory.

January 8 to 15, 1921—New York, N. A. C. C. Show, Grand Central Palace.

January 29 to February 4, 1921—Chicago, N. A. C. C. Show, Coliseum.

Society of Automotive Engineers

New York City, N. Y. Society of Automotive Engineers. Coker F. Clarkson, Sec., 29 W. 39th St. Summer Conference, Ottawa Beach, Mich., June 21 to 25, inclusive. First day, Standards Committee meeting. Last four days technical sessions in forenoon, recreation and sports in afternoon, lecture, and dancing in evening.

CONVENTIONS

Asbury Park, N. J., June 22 to 25, 1920—Annual Meeting American Society for Testing Materials.

Atlantic City, N. J., October 22 to 25, 1920—Twenty-seventh annual convention National Implement and Vehicle Association, Traymore Hotel.

Chicago, Ill., September 1 to 3, 1920—Thirteenth annual convention of the National Gas Engine Association.

Cleveland, September 16 to 17, 1920—Credit Convention of the M. & A. M. A.

Gulfport, Miss., October 6 to 7, 1920—Fourth Semi-Annual Convention, Louisiana-Mississippi Automotive Trades Association.

Isle of Palms (Charleston), S. C., June 24 to 25, 1920—Semi-annual Meeting South Carolina Auto Trade Asso.

Minneapolis, Minn., January 11 to 13, 1921—Annual convention of the Minnesota Implement Dealers Association, West Hotel, Secretary C. I. Buxton, Owatonna, Minn.

Ottawa Beach, Mich., June 21 to 25, 1920—Summer Meeting S. A. E.

Foreign Events

Antwerp, Belgium—June 26 to July 25, 1920—International Exhibition of Commercial and Agricultural Tractors, Camions and Motors. August 1 to September 15, 1920—International Exhibition of Sports, Side Cars, Motorcycles, Cycles, Accessories. Information and application forms may be obtained of James Gustavus Whiteley, Belgian Consul, 223 West Lanvale Street, Baltimore, Md.

London, England—October—Commercial Vehicle Show. November—Passenger Car Show, Olympia.

Prague, Czecho-Slovakia—July 17 to 25, 1920. Twelfth Annual Automobile Exposition, auspices Czecho-Slovak Automobile Club of Prague, Prague Exposition Grounds. Domestic and foreign exhibits of Land, Water and Air Motor Vehicles, Tractors, Accessories, and Automotive Manufacturing and Repair Tools and Machinery. Exhibits duty free, space 100 Czecho-Slovak crowns per sq. meter.

Trailer Association Against Tax

The Internal Revenue Bureau has ruled that semi-trailers are taxable as parts of automobile trucks. The Trailer Manufacturers' Association is trying to obtain a revision of this ruling, and will, if necessary, take the matter to court to test the ruling's validity.

Five new members have been added to the association: Lee Loader & Body Co., Chicago; F. P. Lyons, Inc., Manchester, N. H.; E. & W. Mfg. Co., Milwaukee; Byron Engineering Works, Louisville; Lapeer Trailer Corp., Lapeer, Mich.

An association committee on patents will prepare a plan to obviate, if possible, litigation among members over alleged patent infringements. The committee will report in September in Cleveland.

The trailer association has decided that the capacity rating of semi-trailers should be based on the total load transported and the capacity of pole, pipe, and logging trailers or "dollies" on the actual weight of the portion of the load supported by the trailer itself.

"Truck by Trailer" has been adopted as the slogan to be used by the entire industry, and a distinctive design, embodying the slogan, is to be made.

College Studies Motorized Farming

BATON ROUGE, LA., June 10.—The bill creating the new agricultural college to become a part of the Louisiana State University provides that one of the departments of study shall be instruction in the benefits and uses of automotive vehicles on the farm. The course will include training with tractors and trucks and other motor farm implements; electric lighting plants, portable motor saw mills, and similar modern equipment for facilitating agricultural work. There will also be considerable instruction on the building and maintenance of good roads, and comparison of truck shipment methods with horse-drawn vehicles, railroads and waterways. General driving and upkeep of automobiles and internal combustion engines will also be taught, and the use of the passenger car upon the farm.

Trucks Through Panama Canal

SAN FRANCISCO, May 15.—One of the largest truck-selling houses on the Pacific coast, with salesrooms in Los Angeles, Portland, Seattle, as well as in this city, will receive trucks from the Atlantic seaboard to its Pacific ports by water. Twenty-eight days from New York is the guarantee of a steamship company. The shipment will cost less than if by rail.

Twenty-Four Hour Traffic Census Shows Big Jump in Truck Transportation

An indication of the rapid increase in motor truck transportation throughout the country is given by a 24-hour traffic census taken recently by the Travel and Transport Bureau of the B. F. Goodrich Rubber Co. on the Akron-Cleveland road at Stow Corners, ten miles north of Akron.

The census showed that during the past two years truck transportation increased 171 per cent. Passenger automobile traffic showed a gain during the same period of 27 per cent, while horse-drawn vehicle traffic decreased 52.5 per cent. Traffic of all kind increased 45 per cent.

During the 24 hours, 2891 vehicles passed the observation point, including 2033 passenger cars, 798 motor trucks, 15 motor busses and 15 busses. This compares with 1599 passenger cars in 1918, 295 motor trucks, no busses, and 97 horse-drawn vehicles.

Eighty railroad freight cars would have been required to move the materials and supplies which were carried on that day over the road by motor truck. This represents an annual release of 24,000 freight cars, enough to make up a train 200 miles in length. All manner of tonnage was carried.

More than 100 of the passenger cars which passed the observation point were new machines, being driven overland by distributors from the factories. Some of these were en route to points as distant as Alabama and North Carolina. A large number of new commercial vehicles also passed over the road. If these new machines had been carried by railroad, more than 25 freight or express cars would have been required.

The heaviest traffic was between 2 and 7 P. M., an average of four cars passing every minute during that time. The lowest traffic ebb was reached between 2 and 3 A. M., when only five vehicles passed.

The census showed that the increase in the use of heavy trucks was much greater than in smaller trucks, and that a smaller number of trucks were being run without loads. In 1908 over 35 per cent of the cars passing the point were empty, while this year's figures show only 30 per cent were empty.

Freight Congestion Reduces Tire Output

Some of the large tire factories have been obliged to curtain production, and resort to all sorts of expedients for the storage of finished goods they were unable to ship away. One immense factory closes at 7 A. M. Saturdays, and does not resume work until Monday morning, and will continue to do so until transportation conditions improve, or else will shut down temporarily. Were it not for the part trucks have played in moving some of the production a shut down would have occurred long ago, manufacturers state. Meanwhile, the entire country is facing an ultimate tire shortage.

Morgans Obtain Interest in General Motors

The banking firm of J. P. Morgan & Co. has acquired a substantial interest in the General Motors Corporation. Six new directors will be thus added to the Motors directorate and, it is authoritatively stated, General Motors will push more aggressively its tractor and motor truck units.

A new stock issue totalling $64,00,000 will be offered, 1,419,856 shares of common stock will be offered present common stockholders, in the ratio of one new share to every five old shares held, and these shares will be underwritten by J. P. Morgan & Co. A total of 3,219,856 new common stock, no par value, will be issued.

The proposed financing is to provide additional working capital "to enable the corporation to meet the demands of its constantly increasing business."

The production schedule for the year beginning August 1 is approximately 690,000 passenger cars and commercial vehicles, and 170,000 tractors and farm trucks and parts, accessories and specialties of a total estimated value of $800,000,000.

President W. C. Durant's circular to stockholders states: "The gross capital employed has increased nearly eight times in four years, and the proceeds of sale of this new common stock will supply $64,000,000 additional. Gross sales have increased over five times, while net earnings before Federal tax deductions have increased six times. Fixed assets have increased from $15,819,851.85 to $153,803,642.42, or nearly ten times.

St. Louis Becomes a Seaport

Millions of tons of freight are sent up the Mississippi River to St. Louis from New Orleans on barges, and a large part of the return load, down river, consists of boxed automobiles that are unloaded at shipside, New Orleans, for Atlantic and Pacific South American ports. The immense General Motors plant, nearing completion at St. Louis, announces that it will ship its export passenger cars and tractors in this manner. The car manufacturers of the Mississippi valley will undoubtedly avail themselves of this all-water route more and more.

Inland Waterways Used

The value of inland waterways has been demonstrated by the Traffic Motor Truck Corporation, of St. Louis, during the adverse shipping conditions caused by the switchmen's strike and the shortage of freight cars. A shipment of Traffic Trucks consigned to Liverpool, England, was loaded on barges at St. Louis, floated down the Mississippi River to New Orleans, and loaded directly from the barges to ocean freighters. The Traffic factory has been able to keep production practically up to normal by the aid of drive-outs and barges.

War Department to Send Motor Convoy From Washington to Los Angeles

Plans have been completed whereby the War Department will send a motor convoy from Washington to Los Angeles over the Bankhead National Highway on or about June 15th, due to arrive at Los Angeles September 17. The convoy will be under the supervision of the Motor Transport Corps, and will consist of a motor transport unit complete, at war strength, one service park unit, at war strength, detachment from Engineer Corps, and detachment from Medical Corps. All motor trucks will be one and a half tons capacity, equipped with pneumatic tires.

The tour will start from Washington, passing through the following states: Virginia, North and South Carolina, Georgia, Alabama, Mississippi, Tennessee, Arkansas, Texas, New Mexico, Arizona and California, ending at Los Angeles.

The purpose of this and other overland trips will be to study the handicaps which surround the transportation needs of the army on account of the lack of dependable and definite systems of highways; to secure data relative to the use of various types of motor vehicles; to secure relative data on solid and pneumatic tires; to train officers and men in extended field operations and to recruit personnel for the various branches of the army.

The Federal Highway Council feels that such study by the Motor Transport Corps will be of great value to the entire country, because it will thoroughly establish the necessity of the Federal Government undertaking the construction and maintenance of a definite System of National Highways.

Lieut.-Col. John Franklin will be the Expeditionary Commander of the Convoy across the continent, which will be composed of thirty-two officers, one hundred and sixty men, and twenty distinguished guests. The Convoy will consists of fifty odd trucks and automobiles, making a war procession of over two miles.

Director-General Rountree at Birmingham, Ala., headquarters of the Bankhead National Highway, directed arrangements of the convoy until June 10th, when he returned to Washington to accompany the convoy across the continent.

Canals Superseded by Trucks

New Orleans is entered by five navigable canals by means of which for more than sixty years shellfish, poultry, game and farm produce have been brought to the southern metropolis by schooners and other freighters, including small steamers, from distant farming regions. Good roads have been built along some of these canals and trucks have almost immediately put the boat lines out of business. The canal owners cannot, of course, oppose good road construction without opposing the state's best interests, yet their canals are rendered useless almost immediately upon the completion of a good road paralleling the waterway.

Conference Shows Need of Highway Engineering Education

WASHINGTON, May 15th.—At the National Conference of the leading representatives of Engineering Schools, State and Federal Road Organizations, executives and managers of the Automotive and Tire Industries, and other experts, the fact was brought out that there is a dearth of highway engineers and man power to properly manage motor truck fleets. A. F. Woods, president of the State University of Maryland, stated that "of the five thousand engineers which are graduated annually, fully one-fourth are absorbed by the state and county highway builders, the rest being quickly taken up by American industry. Many more college trained engineers must be obtained within the next three or four years in order that the vast Federal, state and county programs of road construction and repair can be carried on without waste and without the attendant loss to the now overburdened taxpayer. Not only are well-trained engineers needed to do research work, to design and to build our new roads for the motor truck, but there are needed men who can successfully administer these roads.

It was also pointed out that there is a need for men who can sell transportation and that engineers are needed who can be intrusted with fleets of a half dozen or more trucks. The present-day driver will not be tolerated in the future and the driver of a five thousand dollar truck carrying twenty-five thousand dollars' worth of commodities must be more than a mere chauffeur or mechanic. Thousands of these men must have vocational and general training commensurate with their responsibilities.

At this meeting a resolution was passed which in part calls for "an efficient and economical administration of our highway program; that the pressing demand for trained men can only be met by increased educational facilities; that the commissioner of education should appoint a committee to consider this problem in its several aspects and to bring about a fuller understanding of it on the part of the part of the people of the country.

New Vulcan Axle Company is Made Up of Nationally Known Men

Announcement is just made of the Vulcan Motor Axle Company of Detroit, officered by men whose names are nationally known in the axle business.

Following are the executive officers: F. C. Gilbert, President and Treasurer; R. B. Weaver, Vice-President; Sidney C. Love, Vice-President; C. C. Miller, Vice-President; J. T. Hanlon, Secretary, and R. G. Beechler, Chief Engineer.

These men have not only been prominent in the axle industry since pioneering days, but have been associated with one another constantly for over ten years.

The new concern will build a complete line of axles for motor vehicles. It is capitalized at $1,000,000.

A large modern plant has been obtained with ample trackage in the heart of Detroit's Milwaukee Junction manufacturing district. The plant has already been arranged to carry out the production plans of the new company. Machinery and equipment, all of which has been delivered, are being installed.

Production will start early in the fall.

Michigan Pikes Tour

The Michigan Pikes International Good Roads Tour leaves Detroit July 14 for a 20-day trip into Canada. More than 350 persons will make up this touring party, which will be held under the auspices of the Michigan Good Roads Ass'n, The Ontario Motor League, Michigan State Council of Motor Clubs, Detroit Auto Dealers' Ass'n, Michigan and Ontario Chambers of Commerce, and the American Automobile Association.

Passing through Canadian territory as far as the Canadian Soo, the tourists will return to Michigan soil, and pass through the cities along Lake Huron, Jackson being the last night stop.

Seventy-five cars, including 16 Fords, and 16 heavy trucks, will be in line, as well as the Ford Motor Co's. band of 55 pieces, the Ford male quartet and a Ford Weekly motion picture crew. Except at Toronto all night stops will be in camp, and trucks carrying tents, cooks, lighting system and food will precede the tourists. Under the direction of a military officer who saw similar service in France, a camp staff will have camp streets outlined, camp-fires burning, etc., each evening when the main tourist party arrives at a camping halt.

Steinmetz Announces Light-Weight Electric Truck

The Steinmetz Electric Motor Car Co. has located its engineering department in Baltimore, and is considering three city sites for its manufacturing plant. At least 100,000 sq. ft. of floor space will be needed.

Production by fall is predicted for a 1½-ton electric truck upon which experimental work has been practically finished. Dr. C. P. Steinmetz, the sponsor for the car, announces that its chief characteristic will be from 1000 to 1500 lb. less weight than any truck now made to carry the same rated load. This is made possible by a special motor and storage battery, and a one-wheel drive only, eliminating the differential. The driving radius will be from 40 to 50 miles.

Allen Motor Company Has Been Refinanced

The Allen Motor Company, Columbus, Ohio, has been refinanced by plans of a committee of Columbus bankers. One hundred thousand shares of a 300,000 share issue of no par value stock will be sold for $700,000, and $1,000,000 of serial notes issued, secured by first mortgage upon the plants, which are being operated full time at both Columbus and Bucyrus.

Sixteen Trucks Participated in Portland to Eugene Ship-by-Truck Tour

Sixteen capacity loaded trucks left Portland, Oregon, the morning of May 17th for Eugene and return. The first day's run was to Salem, and on the way stops were made at several towns, including Oregon City, Hubbard and Woodburn. Mayor C. W. Mayger, of Hubbard, made a speech of welcome.

Leaving Salem the following morning, the run was to Albany, where a stop was made for lunch at the Albany Hotel, where James Stewart, father of the Good Roads Bond Measure, addressed the meeting. Eugene was the destination for the night, and on the way down stops were made at Cobrun and other points where good road talks were made.

Leaving Eugene, the morning of the 19th, the run was made to Corvallis for lunch at noon. Stops and talks on the Road Bond were made at Junction City and Monroe. An interesting feature of the dinner was a guessing contest as to the value of the Truck Caravan. Don L. Wright, of the Gary, won first prize, with the guess of $103,500. The actual valuation was $103,139.25.

The fourth day's run was from Corvallis to McMinnville, stops having been made at Independence, Monmouth and Dallas for good road talks. At McMinnville an enthusiastic reception was given. Mayor William Houch made an address of welcome from the Lee Trailer. Other addresses made were by W. L. Osborn, president of the Commercial Club; W. M. Copeland, of the Wm. L. Hughson Co., and M. O. Wilkins, of the Dealers' Motor Car Association, on behalf of the ship by truck caravan and the necessity of voting for Bond Measure No. 302.

The fifth and last day of the run was from McMinnville to Portland, stopping at Newberg for lunch. The caravan arrived in Portland Friday evening, in time for all hands to vote as they had shouted for five days, 302 yes.

Following is a list of the trucks and trailers that participated: Federal, Lee Trailer, Fageol, Commerce, Standard, Packard, Jumbo, Graham Bro., Gary, Day Elder, International, Indiana, Reo Speed Wagon, Republic, G. M. C. and Garford. M. O. Wilkins, manager, Dealers Motor Car Association, was director of the run.

Trade Literature

The Stearns Motor Mfg. Co., Ludington, Mich., has issued a new, attractive and exceptionally interesting catalogue. It describes the details of the Stearns Extra Reserve Motors.

Details of the engine are photographically illustrated, blue prints and a phanview of the 4¾ x 6½ size motor as well as a power curve chart are shown. Installation charts are given, showing the 4 x 6, 4¼ x 6, 4½ x 6 and 4¾ x 6½ motors. This interesting catalogue will be cheerfully sent upon request to tractor and motor truck engineers and others interested in industries utilizing gasoline and kerosene motors.

Available Service Instruction Book

The Available Truck Co., Chicago, through its service department has issued a valuable instruction book containing five chapters and a good index. It is of vital interest to every driver and owner of Available trucks. Driver's control, operation, lubrication, upkeep and care, adjustment and repairs, are all adequately treated. Illustrations, diagrams, and charts also add to the book's practical value.

New Electrical Study of Automotive Vehicles

The publishing of a new book, which is a concise and comprehensive treatise of the latest 1920 practice in automobile starting, lighting and ignition systems, was recently announced by the Norman W. Henley Publishing Co., 2 West 45th St., New York City. It is known as the Automobile Starting, Lighting and Ignition Systems, and was compiled and written by Victor W. Page, a member of the Society of Automotive Engineers.

Not only are the various parts of leading systems shown, but the actual application of the various ignition, generating and starting units to leading power plants, and many wiring diagrams have been taken care of. The illustrations of all the wiring diagrams are of representative systems actually in use. Elementary electricity and magnetism also have its proper place in this book.

The General Commercial Company, Ltd., Yokohama, Japan, agents of the Wright Mfg. Co., Lisbon, Ohio, high speed hoists, issues a catalog in the Japanese language.

Rationing Gasoline to Owners in California

Special Telegram: California is experiencing a gasoline shortage which is so acute in certain sections that only three gallons at a time are given to passenger car owners by some companies. On the other hand, the Sheel Co. is giving passenger car owners all the gasoline they want. No restriction in placed on owners of tractors, trucks and stage lines. The automotive trade of California believes that this is propaganda work on the part of oil companies to plan raise in price and to complete ownership of filling stations.

S. V. Norton has been appointed service manager of the General Motors Truck Company, effective July 1, H. L. Beckwith having resigned. He was formerly with the Goodrich Company.

Central California Tour Had Sixty Trucks in Line

SHIP by Truck—Good Roads Week in Central California was brought to a close May 22d with the homecoming of the East Bay Ship-by-Truck tour, after a strenuous, eventful five days' trip.

The tour started from Oakland on the morning of May 17th with sixty trucks in line, twenty-seven trucks comprising models entered by Oakland and San Francisco truck dealers, many of them carrying loads consigned to points on the route of the tour. The remainder consisted of thirty-three trucks, the entire Motor Transport Corps No. 24 General Depot, Presidio, San Francisco, commanded by Captain Paul G. Rutten.

The first stop was at Haywards, where the Chamber of Commerce and business men assembled at a luncheon given in honor of the members of the convoy, followed by open-air talks from the prominent speakers accompanying the tour.

The first night stop was at Pleasanttown, California, where people from the country side attended an open-air speaking program and a military dance given by the army band accompanying the tour. Much the same program was arranged at each noon and night stop with some very effective work done at intermediate points.

A noticeable feature of the tour was the number of farmers who came in automobiles and horse-drawn vehicles from miles around to hear the message of Ship-by-Truck and Good Roads, the tour brought to them.

At some points the stores were closed and high school students devoted a study period to inspection of the trucks to better enable them to compete in the National Ship-by-Truck—Good Roads Essay contest.

The entry of the army trucks and band, which proved a great help in attracting public attention and gaining quick response from local arrangements committees, was obtained by the Firestone Ship-by-Truck Bureau.

Participants recognized the importance of the tour through Contra Costa county, which now has in course of construction four million dollars' worth of concrete highways. This road improvement will open up the territory for trucking to a remarkable degree.

There is no section of California that is as wonderfully blessed through its geographical location, and which can be developed to a higher degree by the use of auto trucks than the region lying to the east of San Francisco Bay. Back of all this the fertile lands that produce so abundantly the agricultural and horticultural products complete the well-balanced commerce of the county.

The tour was conducted under the auspices of the Alameda County Automobile Trades Association. The speakers were Wm. B. Moyle, of the Chester N. Weaver Company, San Francisco, and Robert M. Martland, secretary of the California Auto Trades Association, who also acted in the capacity of train commander.

Governor Stephens, in a proclamation, set aside the week for study of Ship-by-Truck, and mayors and county supervisors recognized the importance of the movement by issuing similar proclamations. Farmers' Co-operative associations, the National Granges and truck dealers' associations in the two counties were members of the reception committees, and it was unanimously agreed by everyone that the trip brought home to agriculture, manufacturing and commercial interests in the two counties the vital message of Ship by Truck—Good Roads.

Showing a Stretch of One of the Concrete California Roads on Which a Short Halt Was Called, and Manner in Which the Fleet Paraded Through the Various Towns Enroute

Making Sketches of Suitable Bodies Helps to Sell Trucks

Prospect Gets Tired of Hearing Nothing But Technical Talk From Truck Salesmen. A Bit of Sales Psychology That Works

NEW and practical ideas are just as useful in selling motor trucks as they are in any other line of business. In salesmanship of any kind the fellow who can think quickly of something to revive the flagging interest of the prospect when the latter shows signs of terminating the interview is the man who finally leaves with the signed contract in his pocket. The pulmotor that puts new life into the sales argument does not necessarily have to be something definitely pertaining to the particular make of truck the salesman is trying to sell; it may have to do with motor trucks in general, or their use along particular lines, or their appearance in the kind of service covering this individual sale, or the advertising value of a truck fitted with a proper type of body and lettered in a manner designed to constantly drive home a message to the thousands of people who will see the truck in its daily rounds.

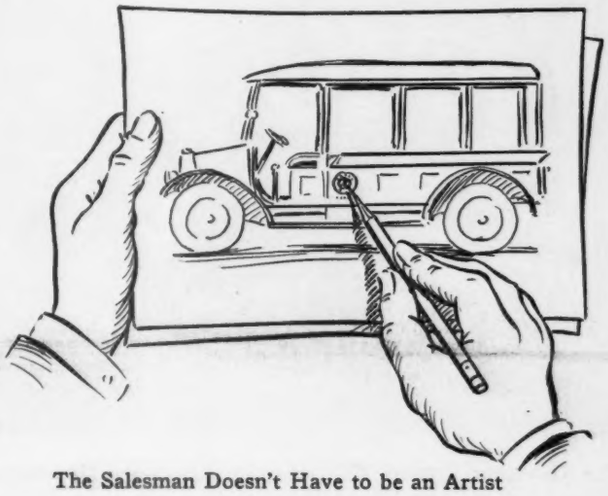
Which brings us down to the fact that Harter Hull, sales manager of the motor truck department of the Sears Automobile Co., of Des Moines, Ia., realizing the value of sales arguments beyond the mere statement of engine horsepower, wheelbase, gear ratio and the usual run of stock sales material, has developed a very graphic sales auxiliary that has helped him and the salesmen under him to put across many a truck sale in the Des Moines territory.

Mr. Hull was formerly sales manager of a motor truck body building company in Des Moines. While in that position local truck salesmen frequently brought their prospects to him for consultation as to the best type of body for their particular use. Often prospects who were still undecided as to the make of truck they would buy, would be steered into his office and during the course of the interview Mr. Hull would take his pencil and sketch out a rough drawing of the truck represented by the salesman present, with the type of body the prospect could best use in his business.

More often than not the prospect, seeing just what his truck would look like with the body on it, would make his decision on the spot, and Mr. Hull found that he was putting the clinchers on many truck sales that in the ordinary course of events might easily have been lost. This set him to thinking and the result is his present position with the Sears company. Speaking of his unique method of helping truck sales, Mr. Hull says:

"There comes a time in almost all motor truck sales when the prospect gets tired of mere technical arguments. He has usually been canvassed by several truck salesmen, and his head is so full of engine sizes, gear ratios, tonnage capacities, etc., that he is pretty much up in the air as to what kind of truck to buy, and he is quite ready to drop the whole idea of purchasing a truck, for the time being.

"About that time I have found that drawing his mind away from the purely technical side of the motor truck question is pretty good sales dope, and I take a piece of blank paper and begin to sketch out the outlines of my truck fitted with a body such as he ought to have in the business he intends using the truck for. It doesn't have to be an expert drawing, anyone with a little ability with the pencil can do this sort of thing.



The Salesman Doesn't Have to be an Artist

"As I draw I call his attention to the adaptability of the type of body to his particular needs, and if there is any way to show him its advantage over a horse-drawn wagon, I call his attention to that, too. Show him where it will save him time in loading, perhaps, or in facilitating unloading. Perhaps I sketch in his firm name on the side of the body, together with some motto the company may have, or something like that, and enlarge upon the advertising value a big motor truck has, something after this manner:

"'You see, Mr. Blank, you can put your firm name and business on the side of the body this way, so everywhere the truck goes it will be a traveling billboard advertising your business. You've got a pretty fine business, and you know it, but you can't go around the streets with a signboard hanging from your neck telling people it's a fine business. You can, and do, pay good money for billboard space, so why not make your motor truck a constantly moving advertisement for your business, going to every part of the city and being seen by practically every one in the city at some time or other. Billboards are planted in one spot, only the people who pass that spot see them. A motor truck travels everywhere; as an advertisement for your business it can't be beaten.

"'And right here, on the side of the cab, or maybe, better, down in this corner, you can have your telephone number, together with your trade mark, in colors, right where it will be seen by every one who looks at the truck. It's all valuable advertising, and you mustn't overlook that fact in buying our truck, with a body on it like this.'

"First thing you know the prospect has forgotten all about his perplexity of mind over the various technical details he has been called upon to digest, and is thinking of your truck as already purchased and sailing around town advertising his business as it was never advertised before. And the name goes on the dotted line a whole lot easier then, and the sale is made.

"As I said before, the sketch doesn't have to be a fine work of art; any truck salesman who is working every angle of the business, can easily practice the stunt till he becomes proficient. Various types of bodies will be found in the trade magazines and it is an easy matter to become familiar with these types so that they may be sketched off from memory. Before calling on a prospect it is well to have in mind just the type of body best suited to his needs, and be ready to sketch it off, always on your own truck chassis, when the time is ripe for it.

"I have used this plan in many truck sales, and it works very well. My salesmen use it, also, with good success, and I feel that is just one more bit of sales ammunition added to our equipment, and motor truck salesmen need all they can get. It is putting into effect just a bit of sales psychology, leading the prospect's mind along the channel you want it to follow, and it gets results."

Mr. Hull is president of the Des Moines Truck Dealers' Association and has been exceedingly successful in the sale of motor trucks in the Des Moines territory, so that anything he has to say concerning truck salesmanship has the authority of success in that field behind it. The idea he here puts forth is well worth using by truck salesmen.

Motor Trucks Haul $2,500,000 Worth of Tire Fabric From New England to Akron

When Rail Shipments Were Tied Up, Motor Trucks Came to the Rescue and Kept the Tire Factories Going

HOW the motor truck again saved the day is told in the following account of transporting fabric from the New England states to the rubber factories in Akron during the recent strike of railroad freight handlers. Practically all of the big tire companies were within a few days of the end of production when the April tie-up of freight and express took place. No immediate relief was in sight but nothing daunted the ardor of the men whose duty it was to see that materials were on hand to keep the factories running.

When it was found that there was absolutely no chance to get shipments through over the rail lines, representatives were sent to the cotton mills district with instructions to enlist all the motor trucks they could get and start them rolling towards the factories over the Lincoln Highway.

The trucks were mobilized in the vicinity of Providence, R. I., where they were sent to the various mills in that District and loaded with the fabric that had accumulated ever since the strike had laid up the freight cars. Some fear was expressed that because the trucks were on solid tires and of five-ton capacity and loaded with five tons of fabric that they would have difficulty in negotiating the road through the Allegheny Mountains. There was, however, no reasonable delay. The trucks proceeded to New York and there followed the Lincoln Highway westward, there being only one or two detours along the road which caused a slight delay. A caravan of 20 Mack trucks carrying fabric to The Goodyear Tire & Rubber Company made the run from Providence to Akron—a distance of 750 miles in 102 hours running time. This is a fair average to strike for all the trucks that made this trip although some were actually on the road over a week. The Goodyear Company employed 100 trucks to transport 1,000,000 pounds of fabric worth $2,500,000.

The Goodyear Convoy Climbing the Allegheny Mountains

Bad Stretch Delays Hundreds of Trucks

The steady stream of heavily laden trucks carrying freight from the East to West over the Lincoln Highway was met by a stream of new cars being driven from the factories in and around Cleveland and Detroit thru to New York and the combined traffic had the effect of making several stretches of poor road almost impassable. At East Palestine, Ohio, the road was torn up to such an extent that at one time there were 200 trucks stalled until repairs could be made to move the line.

At Chambersburg Penn there was considerable commotion among the truck drivers when they found that a half mile section of the Lincoln Highway just beyond McConnellsburg had been closed by order of the contractor. The drivers and those in charge of the convoy appealed to the residents of the cities nearby and they in turn protested to the State Highway Department and prompt action opened the road once more.

Among the tire companies that took advantage of the Highways to transport their fabric by motor truck were the United States Tire Company; The Firestone Tire & Rubber Company and the Miller Rubber Company. The B. F. Goodrich Company of Akron also found it necessary to have a number of trucks bring in fabric. Each truck employed to carry fabric was loaded with 10,000 pounds at the mills and each load was insured for $25,000, the fabric being worth $2.50 a pound. The movement of fabric is said to be the biggest truck transportation venture from the East both in point of distance and volume of shipment. It was necessary in order to secure the trucks at Eastern points to contract for a round trip haul. This meant the hiring of trucks to transport for a distance of 1500 miles the distance one way being 750 miles. When the caravans arrived in Akron they were immediately loaded with products such as rubber heels, soles, tires, tubes, cement and accessories in connection with the tire business that were destined for points in the East including cities from New York to Boston.

R. S. Wilson, manager of the Truck Tire Department of The Goodyear Tire and Rubber Company, declares that this shipment of fabric was the most remarkable instance of the emergency value of motor trucks that has ever occurred in this country. Several firms in New York engaged in long distance hauling entered fleets of ten and more trucks for the purpose of testing out the long run to Akron as a basis to estimate rates and schedules in long distance haulings. The trip proved that solid tired trucks could negotiate the macadam roads thru the Allegheny Mountains.

Pneumatic-tired trucks have been using the Lincoln Highway for the past three years, before and since the war, to transport supplies from Akron and other points through the eastern states. It was observed by the men who came over the Lincoln Highway with these trucks that the roads were in excellent condition with the exception of one or two places where traffic had broken down the road base which was not of sufficient depth to support the heavy truck loads. It was also noticeable that residents in all the towns along the Lincoln Highway were extremely enthusiastic over the motor truck traffic and the constant rolling of trucks and new cars over this road and thru their villages. This meant a revival of local enterprise as new places were opening to take care of the needs of the drivers and those in charge of vehicles who would stop over night with their equipment. The leading citizens in the villages declared openly that they were very enthusiastic over the new business that was thus being brought into their towns. They also expressed themselves as being in favor of road improvements that would meet the demands being made by heavily loaded trucks either on solids or pneumatics.

The Macbeth-Evans Glass Co., Pittsburgh is taking steps to sue the manufacturers and all sellers of imitations of the Macbeth Green Visor lens, action that will prevent annoyance, damage and loss to innocent dealers.

Protecting the Truck Tradesman's Printed Matter

PRINTED matter costs so much these days—thanks to increased wages, shortage of paper, and all the rest—that every user of silent salesmanship, the retail truck dealer or agent no less than the manufacturer must needs look closely to his investments in advertising. Obvious in possibilities are the economies that come through use of print papers of light weight for trade literature and the gauging of the weights of circular matter so as to make each mailed unit reach the limit allowable under the postage paid. Similarly is there general recognition in the automotive industries of the stoppage of waste that is attainable by frequent revisions of mailing lists that cut out the dead names. But overlooked by nine truck tradesmen out of ten are measures of conservation that are quite as important as any of the other manifestations of thrift, and more lasting in results.

Protection of the truck tradesman's printed matter might, indeed, be proclaimed as a first principle of 100 per cent sales promotion, under present-day conditions. Perhaps in the halcyon days of low costs an occasional man might argue that it was not worth the candle to take any steps to safeguard his printed matter against imitation or simulation for the simple reason that if his ideas were stolen or his copy was pirated he could shift to new expressions of his individuality. That easy-going philosophy cannot stand in the face of current printing prices and the even higher prices that are threatened for the future. To cut selling costs by compelling every piece of advertising literature to yield the maximum persuasive and educational service of which it is capable is well worth the cost of the insurance available for such "risks."

Duplication of Printed Matter *vs.* Loss of Prestige

According to sound economics, too, there never was a time when the business man who had created distinctive printed matter should not have taken reasonable steps to reserve to himself the accruing benefits, if he had but realized it. For it is by no means merely a loss of the cost of printed matter that is pirated. Printed matter emphasizes, interprets and keeps evergreen in the public mind the good will that is created by service and just in proportion as the public mind is confused by duplication of printed matter are inroads made upon the prestige that has been slowly and laboriously won by the established house. Furthermore, this obligation to post his printed preserve against poachers is a responsibility for the truck tradesman himself and cannot be safely left to his printer, however conscientious the latter may be.

When counsel is given to the merchant or manufacturer to protect his printed matter, thought turns at once to trademarking and copyrighting. These constitute, to be sure, the most familiar instrumentalities for keeping competitors at arm's length in the use of the paraphernalia of selling, but they, by no means, represent the entire resource of the motor truck man who does not relish having his advertising inspirations borrowed. The common law affords protection against unfair competition that extends to transgressions in the preparation and use of printed matter and latterly there has come upon the scene a new national policeman, namely the Federal Trade Commission, that, backed by additional statutes against unfair trading, has already shown a disposition to set up a stricter code of ethics with respect to the proprieties of advertising practice.

As luck would have it, one of the first of the test cases that by its outcome has bespoken the sensitive conscience of our new business mentor has developed in a field adjacent to that of the commercial car. The case referred to was that of James B. Schafer, of Detroit, and grew out of the confusion that resulted from the parellel advertising of the Universal Battery Company and the Universal Battery Service Company, so-called. The outcome of the incident was that Schafer was formally ordered to discontinue the use of the word "Universal" in connection with his advertisements of storage batteries.

Duplicating Color Schemes

Most interesting to business men who desire to individualize their printed salesmanship was the principle established in this battery case to the effect that it is "unfair" for a contender for trade to duplicate the color scheme originated by a rival. The first count of the indictment drawn against Schafer, as the proprietor of the Universal Battery Service Company, was that he had imitated the style of advertising previously employed in newspapers, trade journals, directories and other publications by the Universal Battery Company of Chicago to exploit its batteries for ignition and lighting. A second accusation to the same end was that the color scheme originated in its field by the Universal Battery Company had been copied by the other concern. This appropriation of colors, coupled with the fact that the later comer took the name of the pioneer with only the addition of the word "Service" in the advertised name, was held to be in violation of the Act of Congress of September 26, 1914, and that it led the purchasing public to deal with the imitative advertiser under the impression that it was dealing with the creator of that type of advertising.

Protection of the printed matter of firms that have put time and money into the production of unique or distinctive sales "ammunition" has been the underlying motive of a number of disciplinary actions recently taken by the Trade Commission in the tire field. Take, for example, the halt called upon the so-called "Good Wear Tire and Tube Company," when it invaded the automotive markets in the wake of the Goodyear Tire and Rubber Company. The finding by the Federal body was that Leo Cohen and B. Counselbaum, of Chicago, promoters of the "Good Wear" copy, had adopted the style and general scheme that characterized the trade literature of the Goodyear Company. Furthermore, as protection for the various firms in the trade that stick to literal truth in preparing copy, the Chicago men were put on the carpet for so wording their printed matter that remade or "rebuilt" tires were represented to the public as new tires.

Similar Names Confusing to the Public

Befuddling the public and receiving the benefit of another's printed matter was the blunt charge in another tire case that developed only a few months ago, viz., that in which the Great Republic Tire & Rubber Manufacturing Company of Muskogee, Oklahoma, was brought to book for treading on the toes of the Republic Rubber Company. Yet another instance where the authority at Washington discouraged the taking of liberities with the printed matter of an established automotive concern was that in which persons by the name of Symonds were brought up sharply when they put out trade literature under the name of the "Auto Surplus Stock Company in the sales territory (Chicago and vicinity), where the Surplus Auto Supply Company was already well established.

In a number of actions, based on charges of unfair competition, the higher courts of the United States have granted redress to concerns that were deserted by employees who, after severing connection, entered the same line of business and put out printed matter causing the public to believe that the new concern was identical with or a successor to the old. In one case of this kind decided a few years since by the court of last resort in New York state the defendant had misled the public by circulating to customers of the firm with which he had previously been connected a notice of removal to a new location, whereas he was setting up a new business at the new stand and the old firm was continuing its operations at the old address.

It will serve the manufacturer or jobber in good stead if he will bear in mind that he can obtain in the Federal courts far better protection for his printed matter if it be arranged as suitable for cirlation to the general purchasing public than he can hope for if the trade literature be prepared solely for circulation to dealers and agents. The reason for this discrimination is not far to seek. Merchants and distributors or other factors within a trade are supposed to be fairly

(Continued on page 86)

Selling the Customer on Your Service First

That Service is Paramount to Sales is Conclusively Proven by the Rapid Growth of the Hinkel Corporation. Some Pointers for the Young Truck Dealer

By HARRY R. BRATE

AFTER all there is no great secret in the merchandising of trucks. Given a commodity that is needed; that will make money for its owner; that is built right, and about the only thing that is lacking to complete the deal is the assurance that the customer will get service. It applies to the truck as it does to any other commodity. The reason why some dealers sell more trucks than others is due largely to the fact that they sell their prospective customer first on their service, and then **back up what they have said by giving that service.** As a matter of fact, in selling the prospect on the service, one cannot help but sell him the machine on which he expects to give service.

How well that has proven out is shown by what the Hinkel Motor Truck Corporation of Cleveland, Ohio, have done. Two years ago they started selling trucks. This year they expect to do close to a million dollars' worth of business. In fact, during the month of March they sold considerable over a hundred thousand dollars' worth of trucks—so it doesn't appear as though they had set their mark too high. From the very start they have "played up" that word "service." Instead of using the corporation name, they have nick-named themselves "Hinkel Service." When their telephone operator answers the telephone, instead of saying "hello," she answers "Hinkle Service," and so they are educating the prospective customer to think of service from the very start.

Handling the Sales

"We believe," said John Koepke, sales manager, "in closely working our territory, and we find a small territory well worked is more profitable than a larger territory half worked. In order that our men may know just where they are expected to work, and instead of having a man run all over the city, we have divided the city into eight zones or blocks, with a salesman in each block. Each man is responsible for the results in his zone, and he receives credit for all the sales made in his territory. By doing this it avoids two or more men calling on the same prospect, and also enables the salesman to become better acquainted with the prospects in his territory.

"In employing salesmen, I find that appearances and personality are more important than experience in selling trucks. In fact, I would rather have a man that does not know anything about a truck, provided, of course, he understands the business of selling. The reason for this is that I want to teach him our own methods of merchandising, whereas if he has worked for some other dealer, the chances are he has certain fixed ideas that may not coincide with ours. I find that it pays to test out a new man, and I sometimes telephone a prospect, after a salesman has reported he has called upon him, to see whether he has made an impression or not. All that I do is to call the man up and say that Mr. Jones says that you are in the market for a truck, and if he remembers Mr. Jones, I know that he has made an impression, while, on the other hand, if he does not remember Jones, I am pretty sure that he didn't make much of an impression. If Jones doesn't have personality enough to impress his prospect with the fact that he has called, he can't be much of a salesman. While to some this test may not seem important, we believe that it is due us to at least have the fact remembered that we are selling trucks. The dealer is often judged by his salesman, and we want our men to create a favorable impression, even if we don't land the order."

John Koepke
Sales Manager Hinkel Motor Truck Corp., Cleveland, Ohio

Each morning at eight o'clock Koepke and his men go over the calls they have made on the previous day, and also talk over the calls they expect to make that day. After the men have gone out, he dictates a personal letter to the prospects the men have called on, the day previous in which he thanks them for their attention to the salesman and also bring out some particular point the salesman has dwelt upon in his sales talk. If a prospect has bought a truck of some other make, a letter is sent, wishing him success, and asking to be remembered in case another one is bought. This has often brought business that otherwise would have gone elsewhere. Every Saturday afternoon Koepke holds a sort of school with the men, taking up special features that should be emphasized. Each man also gives a report of his work for the week and what he expects to do the coming week.

The salary of each man when he starts is calculated upon a 5 per cent basis of a fixed amount of sales. If after thirty, sixty or ninety days his sales show that he is earning more than that, he is recompensed the difference, so that it still places him on a 5 per cent basis. By doing this they know just what it is costing them to sell their trucks and the men are paid their worth.

Salesman Must Sell Service

The one thing they endeavor to impress upon their salesmen is the importance of getting their prospect to come to their store and see how they are equipped to give real-honest - to - goodness service. One of the first things that a prospect notices when he enters the salesroom is a list of owners to whom they have sold trucks. That list usually contains the names of some owners the prospect knows

The Salesrooms and Service Stations of the Hinkel Motor Corp.

and that helps to create confidence. The next thing that greets his eye is a sign setting forth the Hinkel creed of service, which is: "Service does not mean something for nothing—but—the right work at the right time and the right price."

Selling the Service

The prospective customer is then taken through the stock room in order that he may see for himself the stock of repairs they carry. Their system of perpetual inventory and the bin arrangement is explained so that no time may be lost in locating repairs.

From the stock room he is taken to the service department, where trucks are being inspected and repaired. He is impressed with the fact that in addition to repairmen who are real mechanics, they employ their own blacksmith, bodymaker and painter, so that it is not necessary to send out to have this work done—all of which means service. That the time he pays for labor is actually spent upon his truck; that when a mechanic requires some tool or part from the stock room, he simply writes an order and hands it to a stock boy who takes it to the stockkeeper and secures the material called for, thus saving the time of the mechanic whose pay would ordinarily be charged to the job while he was wasting time in front of the stockroom window. All of this helps to sell service.

When a customer brings a truck in for service, the chief inspector goes over the truck with him and suggests the work that should be done. The customer then orders the work done by going to the service order clerk who takes down in shorthand the order given by the customer and transcribes it onto a repair order which is made in triplicate. After reading it over, the customer signs at the bottom, authorizing the work, and is given a receipt which must be presented before he can secure the truck. One copy of the order goes to the main office, one to the foreman of the service department and the third is retained by the cashier of the service department. When the owner returns for the truck, he presents his check or receipt to the cashier. After the customer pays the amount of the charges, he is given a release which is in turn given to the watchman who permits him to take out the truck. This system not only prevents other than the owner getting the truck, but insures all work being settled for before it is taken away.

"Like other dealers," continued Mr. Koepke, "we have to contend with the used truck problem. When a salesman reports that his prospect has a truck he desires to "trade in," either Mr. Hinkel or myself make an appraisal, and we only allow what we consider it is worth. In other words, we do not allow more than we believe we can get out of it, simply for sake of selling new one.

Handling the Used Truck

"When the truck is brought in it is run into the repair department and thoroughly overhauled. If new parts are needed, they are supplied. We then take it to our painting department and give it a good coat of paint. All of the work and repairs are charged against the job at full price, so that the shop gets credit for this work the same as all other.

"We do not, however, believe that used trucks should be sold in the same store as new ones, and for that reason we have another store located in a different part of the city, and which we run under a different name. The reason for this is that should anything go wrong with the truck, it prevents their condemning the Hinkel Motor Truck Corporation, and thus possible making a customer "sore" at us. By this I don't mean to convey the impression that we do not stand back of the used truck we sell, for we do, but a used truck is a used truck and one never can tell."

Hinkel's Service Creed

Service does not mean something for nothing; but the right work at the right time and at the right price.

Even the telephone operator impresses the customer with the service rendered by the Hinkel Motor Truck Corporation by answering all phone calls with:

"Hinkel Service"

Service Holds Sixth Annual Convention

The sixth annual sales convention of the Service Motor Truck Co. has just been held at Wabash, Ind. Over three hundred dealers were present, including not only those in this country, but many of the foreign distributors as well.

Sessions were held in the auditorium on the third floor of the administration building, and meals and banquets were served at the factory dining room.

A daily newspaper, announcing the program for the day, and containing appealing cartoons and humorous personals, was published each day of the convention, and was distributed to each delegate in the morning, reviewing the work of the preceding day.

Merchandising transportation, instead of selling trucks, was the keynote of the convention.

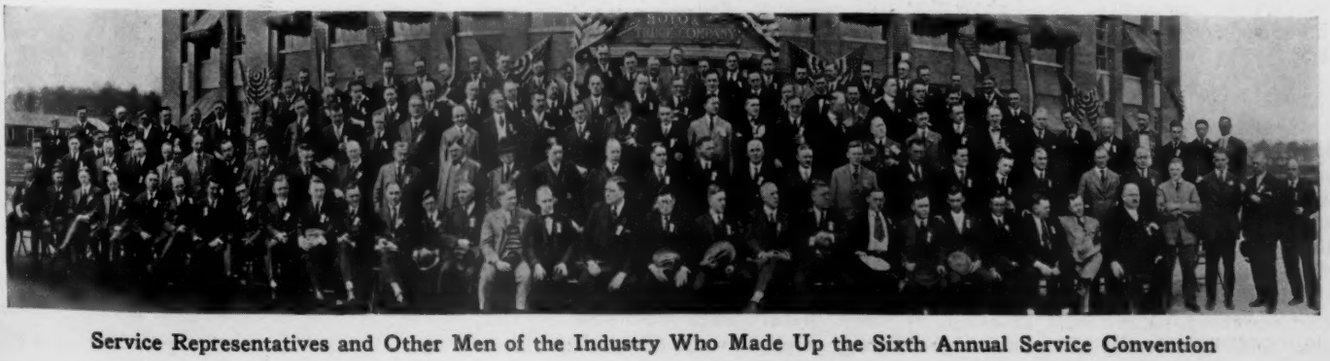
Sunday, May 9th, was registration day and the day's events included a golf tournament and airplane flights for those who cared to visit the fleecy clouds of the firmament in the afternoon. Over one hundred of them satisfied this desire. A forty-five piece Service Band and a smoker provided entertainment for the evening.

Monday and Tuesday's schedule provided interesting talks and discussion on a wide variety of subjects pertaining entirely to automotive topics of the day.

Priorities Not Expected

NEW YORK, June 1.—Robert S. Parsons, general manager of the Erie Railroad, states that no priority orders on shipping has been issued by the commission and none were expected unless the plan of determining essentiality of shipments proved incapable, he said:

"Under this system there will be no discrimination against passenger cars any more than against hundreds of other commodities. They must give place, however, in shipping preference to foodstuffs and articles of industrial importance. The automobile industry will be effected more than other industries, only because of its greater requirements."



Service Representatives and Other Men of the Industry Who Made Up the Sixth Annual Service Convention

Some Slants on the Relation of the Factory Sales Organization to the Motor Truck Dealer

District Man is Sometimes Careless in Selecting Representatives and Factory Gets the Black Eye. Should Deal Squarely With Dealers in Discounts. Some Real Incidents

At the recent meeting of the National Association of Motor Truck Sales Managers in Chicago, the program was essentially a "dealer" program, inasmuch as most of the papers and discussions related to the dealer and improvements in his methods and manner of doing business. Much that will be productive of permanent good to both the dealer and to the factory sales organizations was brought out at that meeting. and it indicates that the factory sales executives are keenly alive to the necessity of bettering not only their dealer connections, but their factory's relations with good dealers after the latter are signed up.

It has often occurred to me that sales executives do not scan the work of their district sales representatives as carefully as they might. Possibly they are too busy with other details to be able to give this matter the attention it warrants. If a district man signs on dealers who sell the required number of trucks, that seems to mark him as a success, in the eyes of his employers.

Building for the Future?

If the immediate sale of trucks is the only thing desired, then he is a success, but it would seem that motor truck manufacturers who expect to be in business a year hence, or three years or ten years, would do well to have some means of knowing something of each dealer's methods of doing business, some inspection system by which they may keep in touch with the dealer organization, and know whether their company is being given a black eye before the business men of a town, or whether its representative is building on a solid foundation, through honest, legitimate business methods.

The district man and the things he does in his territory may be of inestimable harm to a truck manufacturer, even though, on the surface, his work may seem excellent. Sales may be many and well distributed through his "dealers," yet a more careful scrutiny of the type of "dealers" he has secured would show that the company is riding to a fall in his district just as sure as the rising of the sun.

The Owner Poses as a Dealer

An instance of what I mean came under my observation a short time ago in a midwestern city, and the truck manufacturer involved probably thinks he is at last well started in a territory where formerly he made little progress. I happen to think differently.

The district sales representative, after long searching, signed what he considered a "find" as a dealer. This man owned a brewery, which he turned into a soft drink producer when the country went dry. To distribute his products he needed a fleet of trucks, so he peddled his wants among the local dealers, with the usual stipulation of this type of buyer that he must get a discount that would leave the dealer practically nothing. Not succeeding in this, he bethought himself of the manufacturer, and soon got the ear of the district man of one of the large truck manufacturing companies.

To the district man he represented that he had decided to become a truck dealer, "on the side," and placed an order at once for eight trucks (to be used in his soft drink business). He stated he would put up a fine big building to handle the truck business, etc., etc., and made many other fine promises to the manufacturer's representative. All this got him what he was primarily after, the eight trucks to be used in his own business, at dealers' discount, but it is very doubtful if he ever orders another truck, unless for himself.

Yet the district man probably went back to his factory in high glee, with a new "dealer" all signed up, eight trucks right off the bat, and the future bright. And legitimate truck dealers in that city, with real investments in their business, working hard to make a real future for the truck business as a whole, have to stand by and see eight sales taken out from under their noses just because an ex-brewer put it over a district sales representative.

In a few months the factory in question will probably awaken to the fact that it hasn't, after all, a dealer in that city, and around will go the district sales man again, canvassing the really legitimate dealers all over again, to try to get one of them to take his line. It will be through no fault of his that they are still there to be canvassed.

The Price Cutting Evil

Manufacturers of motor trucks know that no single thing hurts the dealer's business these days more than cutting prices. Yet it is the practice with some manufacturers even at this late date to have a system all their own of cutting prices in their dealings with different dealers in their organizations. Here's a little example from real life:

I was talking a short time ago with one of the leading motor truck dealers in a city of over 200,000, a man who knows the business through association with it from its very infancy, and a dealer that any motor truck company should be mighty glad to get. Said he:

"When I took on my present line of trucks I was negotiating with another manufacturer at the same time, and had just about decided to take his line. I liked his truck very much. It is a well-built line, with good variety of sizes, and they seemed like people who were on the square. But the trouble was, they would only give me 25 per cent discount, while the other people with whom I was figuring allowed me 30 per cent. My dealings had all been with the sales manager of the company, and as he wouldn't change the discount, I passed them up and took on my present line.

"Shortly after I had closed with my present principals, along came the district sales representative of the twenty-five-per-centers, and you ought to hear him holler when I told him why I had passed up his company.

"'Why,' said he, 'I wish you had let me know what the trouble was. I would have given you 30 per cent, of course, just like the others.'

Consistent Prices Demanded

"And I was mighty glad then that I hadn't taken on his line, for if he represented a company that gave a dealer 25 per cent if they could put it over, or 30 per cent if he held out for it long enough, how was I to know that some other dealer wasn't getting 35 per cent, or even more? No, thank you, I don't care to do business with a company that has one price to me and a lower price to some other dealer. If they treat their dealers that way on prices, how would they treat them in other matters?"

There is food for thought for some manufacturers (fortunately not many) in that experience. Had this company pursued the only fair and square policy with regard to dealer discounts, it would today have one of the best truck dealers in the state representing it in this big city, in all probability a permanent connection. As it turned out, the company is still after a dealer in that city.

Regarding Factory Co-operation

These are days when the average sales manager of a motor truck manufacturing company wishes he had a cyclone cellar to which he could sometimes retire when the dealers get too hot on his trail for deliveries. Hardly a company in the business but that is far behind on orders, and from all points of the compass come to the sales manager's desk wires, telephone calls and dealers in person begging, imploring, threatening, yes, almost cursing

(*Continued on page 100*)

NEW COMMERCIAL CARS

Available Brings Out New Seven-Ton Model

THE Available line of trucks has recently been augmented by the addition of a new 7-ton model H. This new job increases the well-known Available line to five different models. They are Commercial Wagon, 1½-ton capacity; Power Vehicle, 2½-ton capacity; General Utility, 3½-ton capacity; Royal Champion, 5-ton capacity, model H-5, and the new model, Invincible, 7-ton capacity. The new model, a giant in size, was designed to withstand the most gruelling strains of heavy hauling under unfavorable load conditions, rough roads and streets. It is constructed along the same lines and contains practically the same units as the 5-ton model, differing, of course, in the respective sizes of the parts.

The first number of this model, now being operated in Chicago, carried for its maiden load 21,800 pounds of coal.

The engine is a L-head type Waukesha, with a bore stroke of 5 and 6¼ in., respectively. The exhaust and intake valve tappets are completely enclosed. It has an S.A.E. rating of 50 h.p., and is claimed to develop a maximum of 56 h.p. at 1200 r.p.m. The engine is mounted directly over the front axle, being suspended from three points. It also receives the full benefit of the front springs. The high position of the engine in the frame permits of easy access to the carburetor, magneto, governor, valve tappets, oil filler cap and sight gage. Another feature of accessibility is the fact that the timing-gears can be readily removed without disturbing the balance of the engine. The clutch, control levers and transmission are also separately removable.

Lubrication is through the force feed and splash system. A centrifugal oil-pump is included in this system. Ignition is through a high tension Bosch magneto, and all wiring is carefully protected against the deteriorating action of oil or grease. The gasoline, which is stored in a 27-gal. tank, is fed through a hot-air tube to a Stromberg carburetor.

The Chicago radiator, which is of the corrugated tube and fin type, and has ample capacity, is used. The radiator shell is heavy and is thoroughly protected by a heavy bumper attached to the frame, and seven steel ribbed guards in front of the core. The entire radiator is floated on enclosed double-springs, which work in oil at each side. This provision is said to reduce twisting and pounding.

Cooling is further aided by a 20-in. fan, and the hood side provides ventilation through louvres located well to the rear.

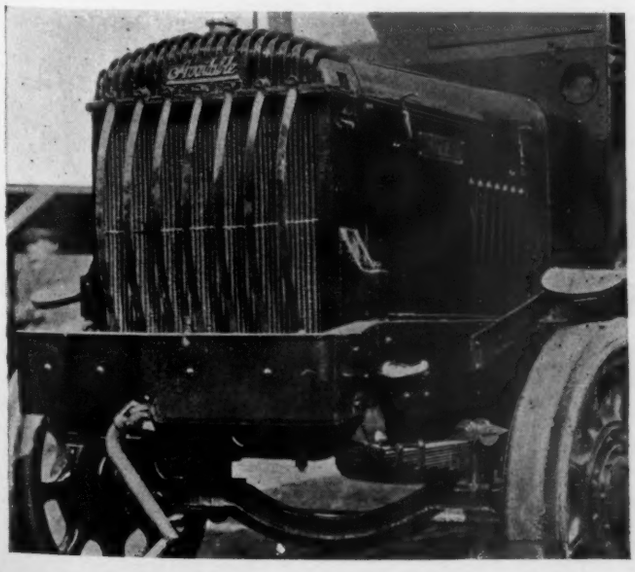
Power is transmitted from the engine through a Brown-Lipe multiple-disk, dry-plate clutch, to a Brown-Lipe transmission mounted amidships. This transmission, which provides four speeds forward and one reverse, is supported by heavy malleable iron cross members that relieve its casing from any strain. A breather tube is fitted to relieve any pressure set up by the lubricant when heated. This provision prevents the forcing of the lubricant out through the bearings. From the transmission, the power is carried to a Savage double-reduction-type rear-axle through a tubular shaft equipped with mechanical, inclosed universal joints. A gear reduction of 14 to 1 is provided by this worm-driven rear axle.

Front Side View of the New Available Seven-Ton Job With Load

Radius rods are employed to take the driving strains and to keep the rear axle in alignment. The company also upholds that because of this construction, the springs thus relieved affords maximum flexibility under all loading conditions.

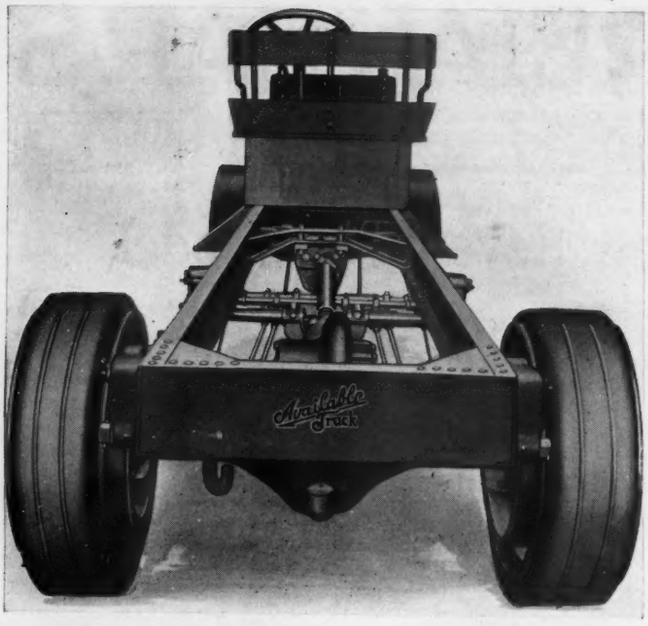
Steering is through a Ross screw and sliding nut type steering gear. The steering drag link is so mounted that wabbling of the front wheels is eliminated. Phosphor-bronze bushings are used throughout.

The hot-rolled channel frame, which is of 9-in. section, with a liberal flange width, and weighs 15 lb. to the foot, is well reinforced with heavy cross members and gusset plates that measure 12 by 12 by ¼ in. At the front end an oak bumper is fastened to an extra heavy cross brace



Close-Up of Front, Showing Sturdy Construction.

Note the rigid bumper assembly, seven-rib radiator guard, flush side lamps, tow hooks, heavy fender braces, etc.



Rear Bird's-Eye View, Showing General Disposition of the Various Units in the New Heavy-Duty Available.

of channel steel, and is faced by a steel plate. The bumper projects well in advance of the front wheels and, together with the radiator shell, forms a thorough protection against front-end collision. This frame is 36 in. wide, and is hot riveted throughout. The heavy-leaf semi-elliptic silicon manganese steel springs measure 34 by 3 in. in the front and 60 by 4 in. in the rear. They are bronze bushed. The front axle is of the conventional drop-forged I-beam section. Cast steel wheels with hollowed spokes, equipped with 36 by 6 front and 40 by 7 rear dual solid tires are used. Internal expanding and external contracting brakes on 24 in. drums, both of which are operated through equalizing bars, are used.

The fenders and steps are made of sheet steel, heavy gage, and the edges of the fenders are reinforced with steel angles which securely fasten them to the frame and step. The steps are of original design and are riveted to the frame. The tool box is built integral with the step. The Alemite system of lubrication is employed on the chassis. The wheelbase is 190 in., and provides 14 ft. of loading space behind the driver's seat.

The standard equipment includes front fenders, three oil lamps, signalling device, hubodometer jack, tools and tool box.

New Packard Pneumatic-Tired Trucks

ABOUT a year ago, the Packard engineers, after studying the situation carefully, decided to design trucks especially for use on pneumatic tires. They hold that a machine intended for solids is not properly designed for higher speed work on pneumatics.

In March, 1920, they shipped their first three-ton specially designed pneumatic tired vehicle. They are now shipping two-ton jobs and the one and a half-ton vehicles will soon be ready.

One of the most important changes is the use of a larger and more powerful engine capable of higher speed on pneumatic tires. The engine revolutions are increased and, naturally, the change speed gears provide different gear ratios. Malleable iron instead of wood wheels are used on all pneumatic tired trucks.

Some interesting facts in regard to tire pressures have been developed, indicating that a higher pressure is desirable than was first recommended even by the makers of truck cord tires. A special Kellogg two-cylinder, model 42, tire pump is mounted on the change speed gear case and, driven from an extra countershaft mechanism, provides ample power for quickly pumping large pneumatics. All tires are mounted on demountable rims. Firestone cords being standard equipment.

Gears, Ratios and Speeds, One and a Half Ton Trucks

The one and a half ton truck on solid tires had a maximum speed of sixteen m.p.h. with a gear ratio of six and a quarter to one. On pneumatics, this gear ratio is seven-one, and the speed is thirty m.p.h. The revolutions of the engine have been increased from one thousand to eighteen hundred, and the bore has been increased from four inches to four and three-sixteenth inches. Front tires are 36 x 6, and the rear 38 x 7.

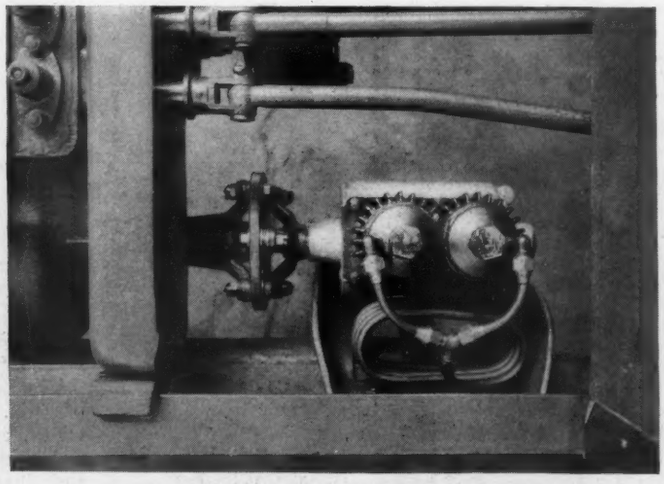
Differences in the Two-Ton Models

The two-ton truck has been increased in speed from fourteen m.p.h. to twenty-seven. The gear ratio from 7¼-1, changed to 8-1, and the engine revolutions to take care of this, from one thousand up to eighteen hundred. The bore from four inches to four and three-sixteenth inches. Tire equipment: Front, 36 x 6; rear, 40 x 8.

The road speed of this truck has been increased from twelve to twenty-four miles, an increase which it will be noted is proportionally greater than on the smaller models. This is fairly typical of what pneumatic tires on trucks really accomplish. The gear ratio has been unaltered, being 9-1, but the engine speed has been increased to sixteen hundred, an entirely new engine being used on this type than when on solids. The old engine was 4½ x 5½, the new engine is 5 x 5½. The three-ton job is provided with 38 x 7-inch front tires and 44 x 10-inch tires on the rear.

Tire Pressures

The pressures first recommended were 90 lbs. for a 6-in. tire. This pressure has been changed to 110; 100 lbs. for a 7-in. increased to 120; 110 lbs. for an 8-in. tire has now been raised to 140 lbs. per square inch, and, whereas formerly 130 lbs. was considered good practice for a 10-inch tire, they now recommend 160 lbs. per square inch.



Special Kellogg Two-Cylinder, Model 42, Tire Pump
It is mounted on the change speed gear case and driven from an extra countershaft mechanism

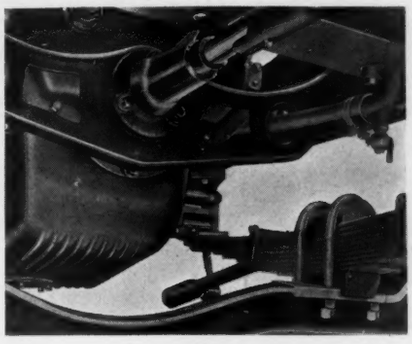
Motor Buses Get Traffic

The majority of Akron, Ohio, commuters make their trips to the city in gasoline-propelled busses. City hall records prove this. Two hundred and eighteen busses operate between Akron and surrounding communities. The Fay Motor Co. operates sixty-five buses between Akron and Cleveland. Two realty companies operate buses between Akron and their suburban development residence sections. Apparently the passengers appreciate the time saved via bus.

New Jumbo Highway Express Model

THE Nelson Motor Truck Co., Saginaw, Mich., is offering a complete truck called the Jumbo Highway Express, Model 20, which permits of a maximum highway speed of 25 m.p.h. with a maximum of 2-ton capacity. In addition to the complete equipment with which this truck is provided and its provision for every possible comfort for the driver, many of the features found on other Jumbo models are incorporated in this new job.

One feature of particular note and interest is the mounting of the engine at an angle of more than two degrees, which permits a straight line drive under load. This mounting of the engine has been worked out with the sanction of the engineers of the Buda Co., and is intended to improve the effectiveness of the drive, by eliminating any angularities at the universal joints.



Showing Pilot Support for Front End of Engine

Also crank case, front spring construction, radiator drain cock. Radiator drain cock cannot become clogged. Drain pipe quickly removable.

Another feature is in connection with the springs. At the front end of the rear springs, the first leaf forms the driving eye, and the second leaf is wrapped around the eye bolt to provide against spring breakage.

The inclusion of a power take-off, tire pump and also power take-off for operating light winches, etc., enables this truck to meet the diversified requirements of farm service in addition to its adaptability as a general utility service unit in other fields of activity.

The power plant is a 3¾ x 5½, Buda engine of the L head type. It is lubricated by the force feed system. Ignition is provided by an Eisemann magneto. Gasoline is fed by gravity to a Zenith carburetor. The power is transmitted from the engine through a Fuller clutch and transmission to a Clark internal gear rear axle.

The radiator is of own make, and is equipped with shutters which are controlled from the driver's seat, giving temperature regulation.

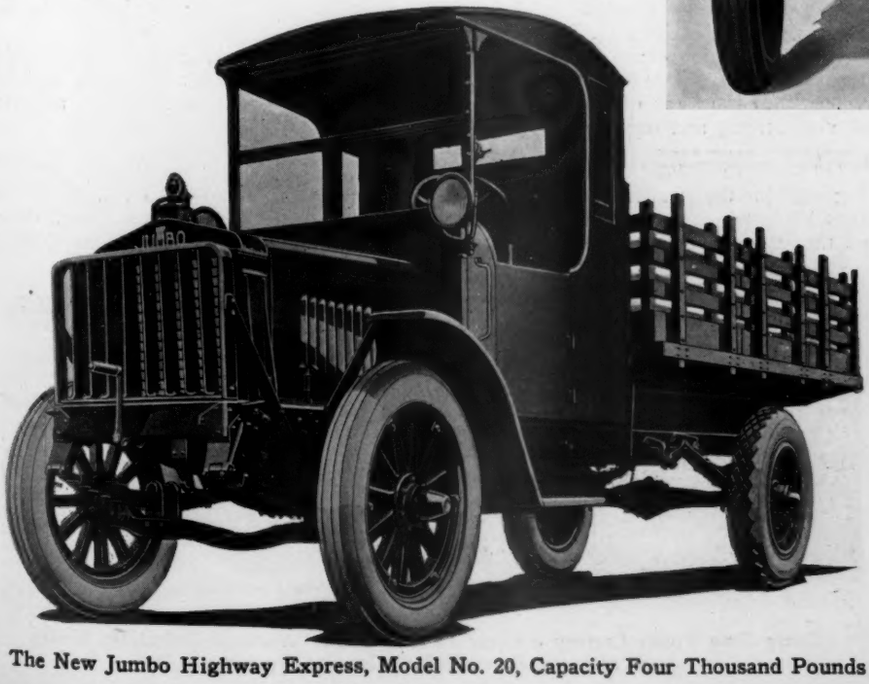
A Moto-Meter is also a part of the radiator equipment. The fan is designed with a shroud permitting air to be drawn uniformly through whole surface of radiator, utilizing all of the radiator space. The radiator filler cap is securely attached, preventing possible loss when filling the radiator. A straight line design from the filler cap to the bottom of the radiator is said to eliminate the possibility of the radiator drain-cock and overflow pipe from becoming clogged. The radiator is effectively protected by a strong radiator guard mounted on the front cross member of the frame and reinforced by braces extending to the sides of the frame. The total gear reduction in high is 7.5:1 and in low 4:1. The steering gear is of Jacox make.

The truck is completely equipped with the Alemite lubricating system and another feature is the assembly of rear-light, which is set flush in the frame preventing lamp breakage.

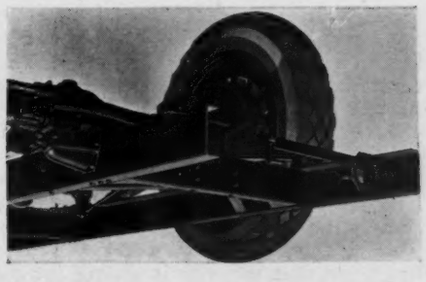
The ten motor car industries of Indianapolis report a probable production of 96,500 automobiles this year. Detroit produces over 100,000 cars a month.

Showing Metal Cab Doors Opened With Disappearing Curtains in Place

Also motometer, radiator shutters, radiator guard, electric lights and other standard features. Radiator filler cap cannot be lost, as it is unnecessary to remove same when filling radiator.



The New Jumbo Highway Express, Model No. 20, Capacity Four Thousand Pounds



Rear End View of New Jumbo

Showing electric tail light set flush with frame to prevent lamp breakage. Also shows diagonal braces and pressed steel cross members.

New Two-Ton Duty Truck a Sturdy and Effective Hauling Unit

THE new Duty Truck not only includes a number of exclusive construction points but it was built to meet the requirements and withstand the vibration and wear, incident to hauling over rough and irregular roads. In fact the Duty truck, designed by engineers experienced in truck construction, is stated to be especially adapted for general working conditions. The general design and suspension is such as to take up road irregularities without racking the frame and parts. Much of the vibration is absorbed and support afforded by different sets of braces which work at angles. Well fitted and braced iron and chrome vanadium and nickel steel are used throughout the construction, scientifically proportioned and distributed so as to make for lighter weight, which incidentally lowers the tire and upkeep expense. The price is $1490.00 f.o.b. Greenville, Ill., and the truck is manufactured by the Duty Motor Co., Greenville, Ill.

Power is furnished by a 3½ x 5 Gray Victory engine having an N. A. C. C. rating of 19.6 hp. and is claimed to develop 35 hp. at 1800 r.p.m. This 4-cylinder engine is of the over-head valve type, detachable head. The 2 in. crankshaft revolves on three large size special die cast bronze backed bearings. All working parts are thoroughly lubricated by the force and splash feed system of lubrication. Carburetion is through a Zenith with hot air drum and assistant vaporizer. Gasoline is fed to the carburetor from a pressed steel gas tank located on the dash. Ignition is provided by a Simms new type high-tension magneto.

The engine is cooled by the Thermo-Syphon system, and includes a heavy cast iron shell radiator with strong reinforcements and new type of patented cellular core, and a large 4-blade aero curve fan. The inlet and outlet openings are 2 and 2¼ in. diam., respectively.

Power is transmitted from the engine through a Covert multiple-disk clutch to a Covert transmission, which provides 3 speeds forward and one reverse. This gear-set is made up of nickel-steel gears and Hyatt roller bearings. From the transmission the power is further carried through an extra large and strong propellor shaft equipped with oil-tight universal joints to a Russel internal-gear rear-axle. The load is carried on an auxiliary, 2⅜-in., solid, round, chrome-nickel, steel axle. The gears of this unit are drop-forged, heat-treated, hardened and ground. Internal expanding and external contracting brakes that actuate on large sized drums are used.

The steering column is mounted on the left hand side along with the standard shift and brake levers. The spark and throttle controls are mounted on the steering column. A foot accelerator is also provided.

The extra heavy front axle is of the Conventional I-beam construction of special drop forging and is equipped with Timken roller bearings.

The heavy 6-in. channel steel frame, measuring 214 in. overall, is thoroughly corner and cross braced and hot riveted throughout. A distance of 123 in. is provided from the back of the driver's seat. A very strong and durable bumper, 5 ft. wide and securely riveted to the projecting legs of the frame fully protects the radiator, wheels and fenders. This bumper is also of 6-in. steel channel. The frame is suspended from four durable semi-elliptic springs of special heavy-duty design. As may be seen from the accompanying illustration, the Hotchkiss type of drive is employed as it is considered to more effectively take up the torque of the drive.

The wheels, both front and rear, are of the heavy truck type having 14 spokes of 2-in. selected second growth hickory. They are standardly equipped with Fisk, pressed-on, solid tires measuring 34 x5 in the rear and 34 x3½ in the front. Fisk pneumatic cord tires, however, may be obtained for both front and rear at an additional cost of $225.

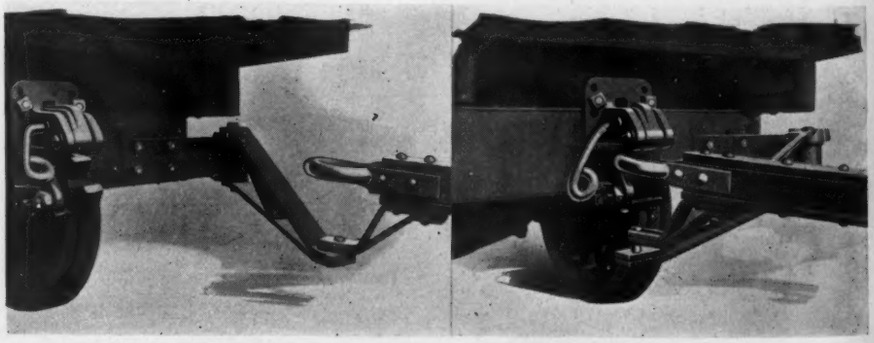
The following are general specifications: Wheelbase, 134 in.; tread, standard, 56 in.; road clearance, 12 in.; turning radius, 26.5 ft.; chassis weight, 3350 lb.

The standard equipment includes side and tail lamps, horn, tool box, tool kit, fenders, running board, bumper, and seat box and cushion.

Showing the New Two-Ton Duty Chassis With All Its Accompanying Equipment

Safety Coupling for Trailer

The Ohio Motor Vehicle Co., Cleveland, has secured patents on a new device claimed to eliminate the dangers of coupling trailers and trucks. The working principle is the outgrowth of long study and exhaustive experimentation. It is known as the Ferris Safety Coupler. This device has a guiding arm which is pivoted on one side of the truck at the rear. A clear conception of the working and instruction details may be obtained by referring to the accompanying illustration. The view on the left side clearly shows the guiding arm swung open. This guiding arm is of the proper length so that when it is swung inward toward the center of the truck, it carries whatever is fastened thereto, directly into the jaws of the truck coupling. In backing up to the trailer, the driver can stop his truck at any point within 20 in. of the correct coupling position get out and place the trailer hitch link on the guiding arm, return to his seat, throw on the reverse power and the guiding



These Two Views Convey a Clear Idea as to the Working Principles Under Which the Ferris Safety Coupler Operates

arm brings the coupling units together where they are automatically locked. As the lock is made, the guiding arm is thrown from the hitch link and is held back out of the way by a tension coil spring. With the Ferris Safety Coupler it is not necessary to bring truck and trailer in a direct line before the connection is made. The device allows sufficient latitude so that any average driver can back his truck without difficulty or waste of time to a position where the safety arm connection can be made easily. The elimination of the danger element in coupling is the outstanding feature, but in actual use it also has been found a time saver and to do away with the necessity of an extra man.

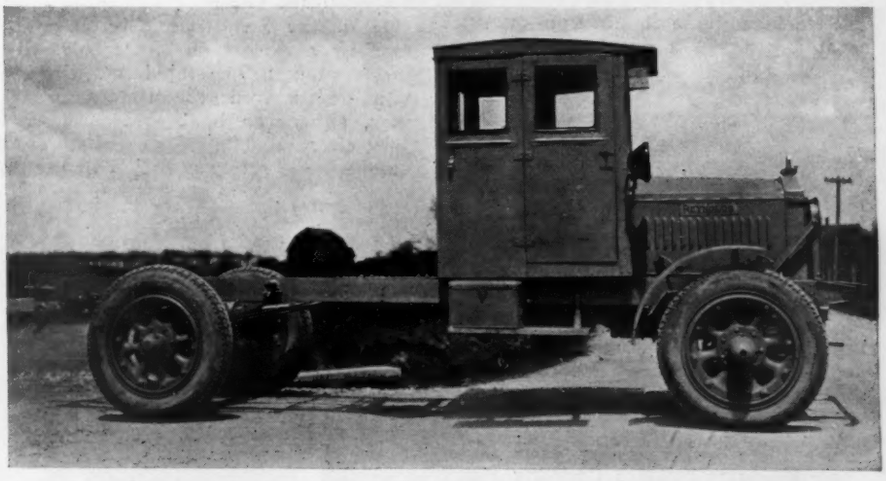
A Most Complete Equipment Features the Reynolds Models

THE Reynolds line of motor trucks now being produced by the Reynolds Motor Truck Company of Mt. Clemens, Mich., are built in four sizes with solid tire equipment—1½, 2½, 3½ and five tons capacity and for fast express service with giant cord pneumatic tires, in three models—1½-2, 2½-3 and 3½ tons.

The only carbon steels used throughout the trucks are in the worm axle housing and rolled channel frame, the latter being heat treated. Elsewhere nothing but 3½% nickel steel is employed even down to the brake rods and shifter rods of the transmission. In place of the usual malleable iron members, steel castings are a Reynolds feature and drop steel forgings take the place of castings which have heretofore been utilized. Friction has been greatly reduced by the use of Bound-Brook, graphite bronze bushings which are inserted throughout the design where ever the slightest degree of rotative movement takes place.

Each size vehicle is identical in design and construction, varying one from another only in the matter of proportion and power. In equipment, the manufacturers have included as a standard part of each chassis, every necessary item required, but the body. This equipment includes the following: Hub odometer, steel wheels, heavy front bumper, strong radiator guard, Moto-Meter, front fenders, generator, self-starter, battery, electric lights, all-steel cab with drop glass windows, towing hooks, spring draw-bar trailer connection, heavy jack and a set of tools. The latter is most complete and of very fine quality, special wrenches for spring clips and other members being included. The radiator is of the built-up type with finned, tubular core.

The four-cylinder engine is water cooled by means of centrifugal pump. The lubrication system is of positive force-feed type to every bearing. A Bosch magneto furnishes current for the ignition while the spring suspended batteries take care of the self-starter and lights. The Stromberg carburetor is used throughout the line, being supplied by gravity from a 31-gal. tank located under the driver's seat; the fuel system further incorporates an auxiliary vacuum system attached to the dash. The gasoline line is of flexible copper tubing protected by a steel covering.



Side View Showing the Pneumatic-Equipped Steel Wheels of a Reynolds Job

Front View of a Reynolds Truck

Included in its equipment are the following: Hub odometer, steel wheels, heavy front bumper, radiator guard, Moto-Meter, front fenders, generator, self-starter, battery, electric lights, all steel cab, etc.

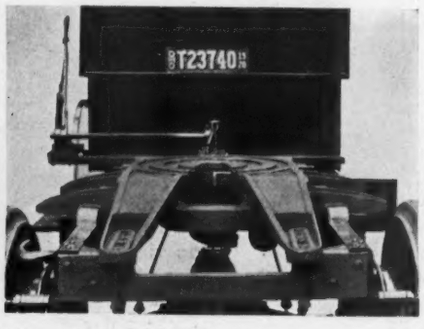
The steering column is mounted on the left side with centrally located control levers. The clutch is of the dry-plate type and the drive from it to the transmission, by means of a special steel shaft fitted with Thermo-Hardy fabric universal joints. The transmission is of the four-speed selective type, mounted as an independent unit amidships and has facilities for power take-off on each side. Where the pneumatic tire equipment is furnished, a power-driven tire pump is added. The propeller shaft is the new type developed by the Universal Products Co. and both front and the rear axles are the army type built by Sheldon.

The frame is rolled channel steel, heat treated and is of the semi-flexible variety. Oil is used as a lubricant throughout the chassis, each bearing being fitted with the new "Blooming" flusher cup which requires but occasional attention. The general design is unusually massive with what might be termed a tendency toward oversize in each member.

Semi-Trailmobile Has Automatic Coupling Units

THE Semi-trailer manufactured by the Trailmobile Co., 538 East Fifth Street, Cincinnati, Ohio, is primarily a city job and is built along lines to make it most adaptable for this purpose. One truck will operate two or more semi-trailers, and they are constructed so that the load carried on them is so perfectly balanced as to enable the truck to operate with the greatest freedom.

The Semi-trailmobile automatically couples and uncouples. The truck being backed up against the semi-trailer, coupling without any aid from the driver or his assistant. It is not necessary to spot the truck accurately to make connections. The truck can be backed in from the sides or at any angle, it not being necessary to back it in from directly in front.



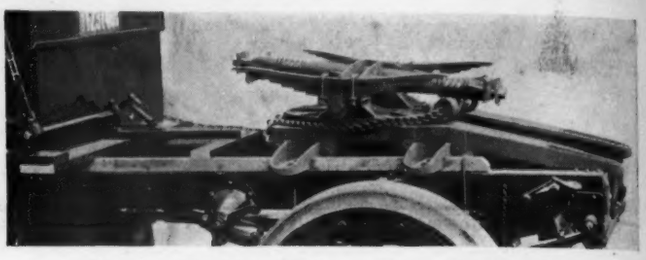
Lower Plate and Coupling Jaws Open and Ready to Receive Coupling Pin

The fifth-wheel of the semi-trailer is suspended from the chassis frame of the semi-trailmobile, and rocks freely on a shaft working in journals which are riveted to the sides of the frame. The lower plate is equipped with two heavy coil bumper springs which relieve the coupling pin and jaws from the shock when engagement takes place.

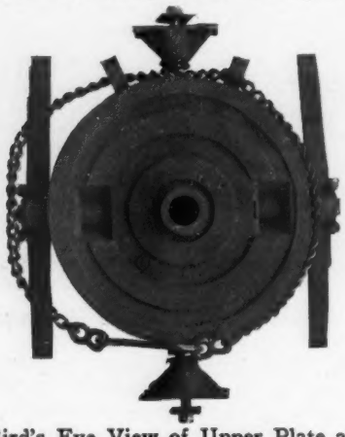
The position of the rocking device, placed in the upper part of the fifth wheel, permits the truck and trailer to rock freely, despite the fact that the truck and trailer are at right angles to each other. It is stated that there is no possibility of the rear wheel of the truck jamming under the chassis frame, due to road irregularities, and thus injuring the tire. These points constitute the features of the trailmobile fifth wheel.

The Semi-trailmobile can be uncoupled from the truck by simply pulling a lever at the driver's seat and left in position for loading or unloading while the truck goes on another trip.

The props or jacks, which are attached to the lower side of the Semi-trailmobile, are operated by a ratchet on either side. Both props may be operated at the same time, or if uneven ground makes it necessary, either can be operated alone. A very effective safety device of the Trailmobile is the safety chain. This prevents the trailer from becoming detached from the truck. The trailer can be pulled any distance, backed or turned on this safety chain alone.



Showing Rocking Shaft on Upper Plate Safety Chain and Release Lever



Bird's Eye View of Upper Plate and Safety Chain

This chain is coupled to the base plate permanently fastened on the truck, passes through the eye on the fifth wheel and is coupled to the base plate on the opposite side of the truck. In this position it acts as an absolute safety device when Semi-Trailmobile is in use.

Semi-Trailmobiles may be obtained equipped with a roller dumping device for lumber, and with special bodies for any type of service.

The semi-trailmobiles are made in the following models: Model P, 2½-ton capacity; model S, 4 tons; model T, 6 tons; model V, 10 tons.

The following is a brief resume of the specifications of the model P 2½-ton job, which closely follows the specifications of the other models, differing only in the dimensions of parts in accordance to the various sizes. The 1½-in. by 2½-in. axle revolving in Bock roller bearings, carries artillery wheels equipped with 36 by 4-in. solid tires. The 4-in. steel channel frame is 168 in. long and 39 in. wide. The tread is 59½ in., and the chassis weight, without platform, approximately 1500 lb. Height to top of front frame section, unloaded, 44⅛ in. Road clearance under axle's lowest point 16 in. Length of the semi-elliptic springs from center to center 50 in. These springs consist of 9 plates, 2½ in. wide. The fifth wheel is 24 in. in diam.

Any model of the entire line may be obtained with or without props.

Position After the Coupling Has Been Completed

Note distance jacks have been lifted from ground. A chain running forward enables the driver to release coupling without leaving seat

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Classified Scrap Iron is a booklet, forty-eight pages, pocket size, issued by Briggs & Turvias, Inc., Westminster Building, Chicago, Ill., operators in scrap iron and allied metals, iron and steel products obsolete and salvageable material and equipment, with branches in New York, and Toronto, Canada. They have compressed more valuable information for the producer and user of these materials than has ever been assembled heretofore. It is the first authentic publication put out by any scrap iron concern.

Proper classification adds to the market value of scrap, and this booklet gives this, worded without technicalities, describing various grades of iron and steel scrap as marketed. This Classification is compiled from average actual practice and will fit closely almost every probable contingency. A table shows weights and quantities of rails and accessories in various combinations of tonnage and length of track. Other tables show net and gross ton equivalents, a tonnage card, weights of plate, standard gauges and specific gravities and weights. The book answers a thousand questions arising constantly and is an invaluable helper for all who touch this branch of industry.

The Benjamin Briscoe & Stahl Engineering Company, Inc., 821 Book Building, Detroit, has been appointed engineers of the Andrews Rust-proofing Process, recently imported from England, where it was successfully used during the war by European governments in rust-proofing munitions.

TRUCK EQUIPMENT AND APPLIANCES

Wade Spark Plug

The Wade Mfg. Co., 415 North 4th St., Camden, N. J., has recently introduced a new plug known as the Wade improved spark plug. This plug is claimed to effectively protect the sparking terminals of all gasoline engines, and also provide means for cleaning the same or preventing the accumulation of foreign substances.

It has a provision for creating a hot spark which acts with an oxidizing effect, keeping the spark points free from oil or carbon deposits, thereby preventing fouling. This spark plug also incorporates a spark gap, which is located within the upright hard-rubber insulator on the top of the spark plug, thus greatly intensifying the current and thereby making a hotter spark at the points.

The porcelain is of the best grade of imported Kaolin, tested to stand six hundred more degrees of heat than is generated in cylinder of an engine. The electrodes are of sub-platinum wire, which is said not to burn, warp or scale under intense heat. The oxidizer is said not to be effected by heat under ordinary conditions and will last as long as the plug.

The Wade Plug Incorporates a Spark Gap.
The electrodes are sub-platinum wire

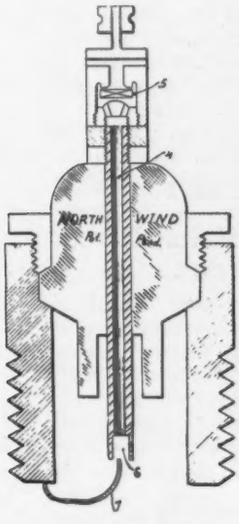
New Cammen Spark Plug

The Cammen Laboratories, 42 W. 39th St., New York City, has discontinued the manufacture of the former model of the Northwind Spark Plug, producing instead a new plug which avoids the necessity of stocking two types. The improvements in this plug show that a flat valve is being used in place of the ball check. In the new plugs, the valves are open to the atmosphere all of the time, except when held closed by compression in the cylinders.

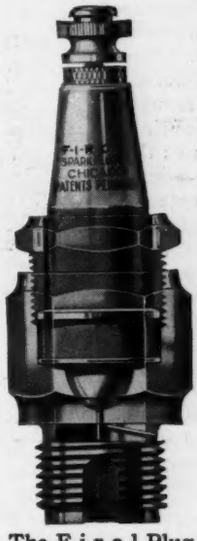
During the suction stroke, the air flows past the valves and through the tubular electrode into the combustion chamber. The maker states the blast of air drawn in will keep the electrodes clear and clean. These plugs are made in all sizes and sell at $1.25 each.

The F-i-r-o-l Spark Plug

The firing points of the Firol Spark Plug, manufactured by the Firol Spark Plug Co., Manhattan Bldg., 431 S. Dearborn St., Chicago, Ill., are made of monel metal and are in the body of the plug above the heated, oil zone. As the explosion occurs at the top of the plug beyond the oil zone of the firing chamber in a temperature ranging from 180 to 350 deg., fouling is said not to be possible. Carbon and soot is said not to adhere to the points as each explosion blows the mixture away from the points into the firing chamber. The opening in the shell of the plug not only permits of rapid cooling from the surrounding water jacket but permits of adjustment of the firing points. This plug retails at $1.50.



Northwind Ventilating Spark Plug
Air is admitted through the tubular center electrode.



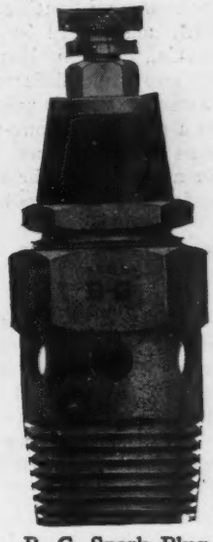
The F-i-r-o-l Plug Has Cooling and Adjusting Feature
Has opening in the shell for access.

There are now 150 American colleges and universities giving one or more courses in highway engineering. Prof. Blanchard, of the University of Michigan is a leader in this direction.

B G Spark Plug

The Brewster Goldsmith Corporation, 33 Gold St., New York City, recently introduced a new self-cleaning spark plug.

The self-cleaning feature of this spark plug is based on the sudden changing of the direction of the gases or air in which small globules of oil are suspended. The oil continues in the initial direction, while the gases make the change in direction. This feature utilized in the construction of the interior of this plug, is in the shape of a small oil pocket in the lower cavity. All holes or inlets are shaped to direct the incoming gas and oil globules into this pocket, where the oil is separated and held in suspension until the spark jumps between the sparking points, causing an explosion of the gases in the combustion chamber, and in the interior of the plug. The combined area of all the openings in the end of the plug is sufficient to permit the interior of the plug to fill with greatly increased pressure. This increased pressure causes a strong blast to pass between the sparking points at the exact time that the current jumps the gap between the sparking points, thus assuring clean sparking points at the most essential moment.



B G Spark Plug Has Self-Cleaning Feature
Note the structure of the skirt.

Canada has decided that the passenger car is not a luxury, but a utilitarian vehicle which has an important part in the development of the Dominion. The former 7½ per cent excise tax war tax on passenger cars and trucks has been abolished, together with other changes affecting the automobile business, which are regarded with favor by the dealers.

Silver Giant Grease Gun

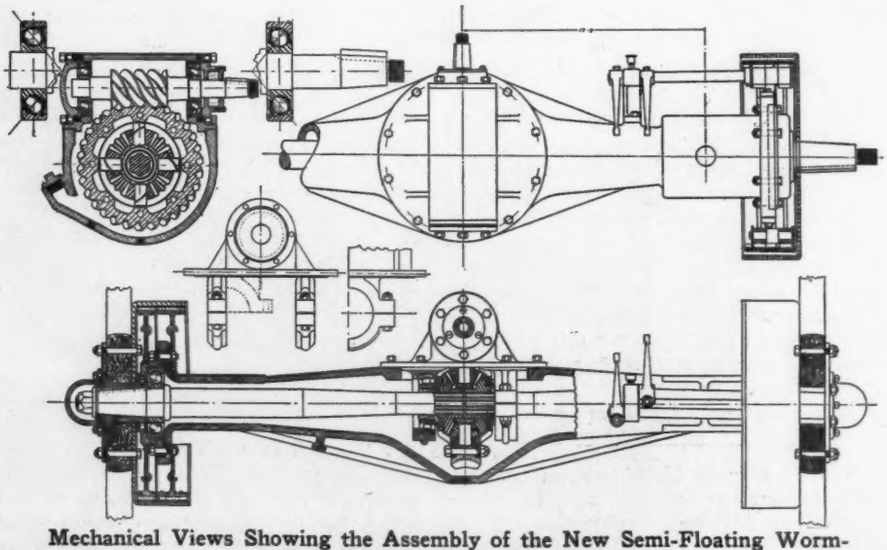
A new heavy-duty grease gun for the rapid and clean handling of either grease or oil is the new product of the Mayo-Skinner Mfg. Co., 2115 Elston Ave., Chicago, Ill. It is made of 16-gage steel, and has a malleable ratchet and a threaded steel piston so that hard grease can be handled easily. The spout for oil is carried in the handle. The washers are made of leather, 3-16 in. thick and so treated to withstand constant contact with grease. This gun is guaranteed for five years. Its capacity is 12 oz; 20½ in. long; weighs 4 lb. and sells at $3.50.

Cutaway View of the New Mayo-Skinner Product

New Frederickson Axle

Many distinctive features are embodied in the new semi-floating worm driven axle recently announced by the Frederickson Axle Co., Benton Harbor, Mich. The worm and wheel differential and differential assembly of this axle, which is mounted as a unit on the one-piece top housing. permits of ready access for repairs as the entire assembly can be removed as a unit. This feature of accessibility also extends to the vehicle wheel bearing and axle drive shaft which can be removed as a unit without disturbing the brake assembly, by unscrewing six nuts. Provision has also been made for the external adjustment of the worm and wheel, by an eccentric incorporated in the end caps of the work housing. Oil retainers are used at all essential points to prevent oil leakage. The main housing is provided with a drain plug, safety oil-level plug and oil filler plug.

Standard materials are used throughout in the construction of this axle. The drive shafts are of special heated steel and have a maximum diam. of 2¼ in. The one-piece steel main housing is reinforced and is said to be free from shrinkage cracks or holes. The worm is of special, heat-treated steel. The proper mesh can be secured for the alloy bronze wheel by adjustment. The worm can be raised and lowered to take up lost motion or slack thereby retaining the true pitch line by this adjustment. The differential is of standard type. The five-pitch side gears have a ⅞-in. face; 1¾-in. S. A. E. 6-spline bore, and the pinions to match are S. A. E. standard throughout. G. A. ball bearings, both of the radial and thrust types are used. Both the service and emergency brakes are internal expanding. The emergency brake drums measure 1½ in. wide by 16 in. diam., and the service brakes, 2¼ in. wide by 16 in. diam. They are of pressed steel. The regular ratio is 7¾ to 1.



Mechanical Views Showing the Assembly of the New Semi-Floating Worm-Driven Frederickson Rear-Axle

Mendall Metal

A new metal for repairing cracks or holes in different parts of a truck or passenger car if independent of the need of retaining tensile strength, is being produced by the 4-A Products Co., Denver, Col. The maker states this fluxates with any metal at 250 deg. Fahr., and will stand 600 deg. heat and 1200 lb. of pressure to the sq. in. after fluxation. A blow torch is the only tool required. It is sold to the trade for use in repairing. Price per package of six sticks is $5.

Tee Bee Nuts, Bolts, Rivets and Screws

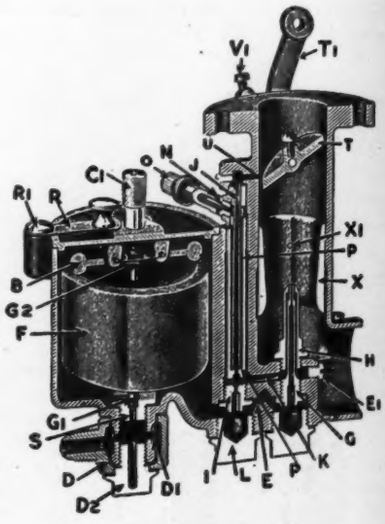
An assortment containing 100 lb. of standard nuts, bolts, rivets, cap screws, studs, spring bolts, set screws, machine and wood screws, and other useful articles of a smaller nature used in a garage, makes up the Tee Bee Garage Assortment. It provides a ready and convenient source of supply for replacing bolts and nuts on repair work. This assortment lists at $7.50 f. o. b. Detroit, Mich., where it is manufactured by T. B. Moore, 376 Grand River Ave.

Zenith Carburetor

The new standard Model "L" Carburetor, built on the Baverey principle, by the Zenith Carburetor Co., 692 11th Ave., New York City, in five sizes, ranging from an intake opening of 1 in. to 2 in., separated by quarter inch intervals, is made in brass for motor vehicle service, and aluminum for larger sizes.

The main jet, the compensator, the cap jet and the lower plugs are interchangeable and manufactured in the European factories of this company. This model consists of a float chamber, a carburetor chamber, a system of nozzles and air passages, hot air sleeve and regulator.

The gasoline enters the strainer body of the carburetor and passes through filter screen, D-1, and enters the float chamber through the needle valve seat. As soon as the gasoline reaches a pre-determined height in this chamber, the metal float actuates levers, B, and collar, G-2,



Zenith Model L Carburetor

which closes the needle valve, G-1, on its seat, S. From the float chamber the gasoline flows through three different channels in various quantities and proportions to the engine. With the throttle fully open most of the gasoline flows through the channel, E, and the main jet, G, and some through the compensator, I, which is located at the bottom of a well open to the atmosphere through holes, then through channel, K, to the cap jet, H, which surrounds the main jet. The main and cap jet work in unison furnishing the proper mixture whatever the speed of the engine. At low speed, the main and cap jet play but a small part in the operation. As there is considerable suction on the edge of the butterfly which is only partly open at low speed the gasoline is drawn through the idling device. This device consists of the idling tube, J, within the secondary wall, P, inserted in the first wall, at the bottom of which the compensator is located and which is opened to the atmosphere through holes. The idling tube, J, leads to a hole located at the edge of the butterfly throttle-valve where the suction is most strongly felt.

The air sleeve is provided with an air strangler and temperature regulator. The

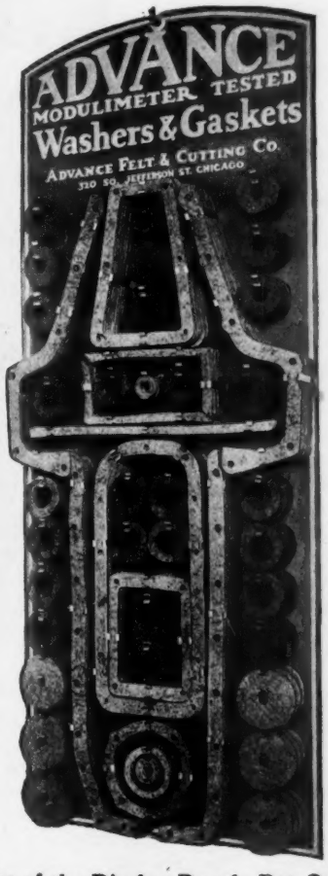
air strangler shutter is actuated by a lever, having a coiled spring to bring it back to the open position.

The idling adjusting screw can be assembled on either side of the carburetor barrel. Frequent adjustments are not necessary, as all that is required is to find once for all the different sizes or settings of air and gasoline passages suitable for the engine. The only adjustment that may be useful is the slow speed adjustment.

This carburetor may be taken apart for cleaning and put together without disturbing the adjustments.

Advance Felt Products

The Advance Felt and Cutting Co., 322 S. Jefferson St., Chicago, Ill., a company engaged in the manufacture of products pertaining to felts in any detail or condition, such as cutting, punching and stripping of felts, cloth, leather and rubber; cutting dies, and a special line of automobile and truck washers, gaskets, etc., have recently brought out a very comprehensive display stand showing its washers and gaskets in all conceivable forms for Fords and other trucks and cars. The list prices vary from $25 to $35, according to the type board desired.



One of the Display Boards Put Out by the Advance Felt and Cutting Co., Showing All Manner of Felts and Gaskets.

The three different display boards put out by this company disclose the Advance line of Advance Modulimeter tested washers and gaskets. These boards have four distinct and unique points of merit. They keep the goods in fine shape, take up practically no space, the goods on the boards tend to sell themselves, and the dealer knows just exactly what he has on hand and where it is.

Another product of this company is the Advance Washer Cutter which will cut felt, rubber, leather, paper, etc., with equal facility and results. A clean, smooth cut is said to be obtained by using this machine. It is a quick, manually operated punch press. In view of its ability to cut any O.D. or I.D. from ⅜ in. to 3¼ in. washer, it is something that can be used to advantage in every up-to-date garage or repair shop. The list price of this machine is $25.

Advance Manually Operated Punch Press for Cutting Washers

Motorlife Lubricant

A high-grade lubricant and carbon remover that is claimed not to contain any acid or other injurious chemicals which can in any way injure the engine is the product of the Motorlife Manufacturing Company, Memphis, Tenn.

This lubricant contains a carbon solvent and heat-resisting units which thoroughly lubricate the upper cylinder chamber and the other various parts of the engine. It sells at $2 a can of 32 oz. each. Price in Canada $2.50 for the same can.

Kerosene Torch

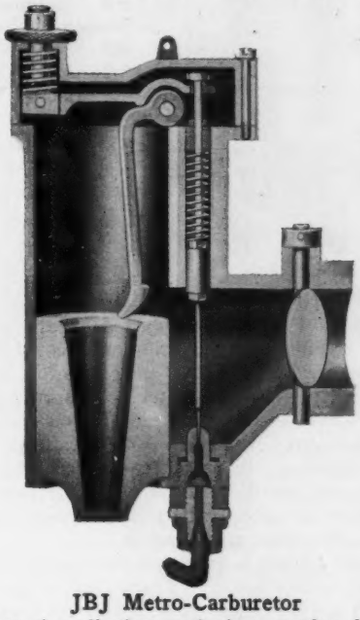
Model 145, one of the most popular models in the Red-Hot line of torches, manufactured by the Ashton Mfg. Co., 184 Emmet St., Newark, N. J., is designed to meet the demands for brazing, tempering and preheating. It is especially adaptable for work on frames, axles, etc.

Kerosene Torch to be Used in Connection With Brazing, Tempering and Preheating

A steady blue flame is maintained by this torch, which uses kerosene as fuel. The tank is heavy-gage, seamless, drawn-steel, the base of which is reinforced by a base band. The fittings are welded in and the tank is tinned inside and out. It is also equipped with a large automatic brass pump and a shut-off valve.

A Carburetor Without Float, Float Valve and Float Chamber

The JBJ Metro-Carburetor, produced by the American Auto Products Co., 240 Broadway, Denver, Colo., has no float, float valve or float chamber, no choke valve and feeds gasoline direct to the spray nozzle. The maker states that this device will automatically measure the air and gasoline entering the carburetor, and deliver the correct mixture to the engine. Another feature claimed is that any water in the gasoline will pass directly on through without the necessity of cleaning out the parts of the carburetor.



JBJ Metro-Carburetor
Note the adjusting mechanism, starting from the upper left corner

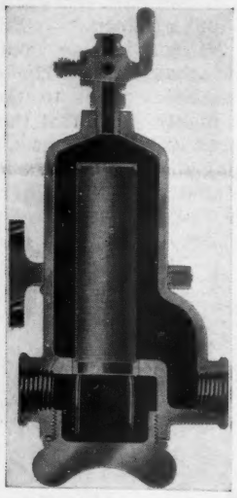
The gasoline enters at the bottom, the amount admitted is regulated by the position of the needle at the spray nozzle. As the suction in the carburetor is increased, the piston rises from its seat and piston also automatically raises the needle valve of the spray nozzle from its seat, thus admitting more gasoline. The initial admits additional air. The action of the adjustment of the carburetor is accomplished through a nut, which will provide more or less gasoline as desired. This carburetor is normally set so that the engine will operate correctly at low speed, the maker claiming that at the higher and pulling speeds it automatically supplies the correct proportion of gas and air. The piston as it rises uncovers a "V" shaped passage to admit air from the air intake to the mixing chamber. This "V" shaped passage has its point at the bottom, so that the raising of the piston uncovers but little air at the start.

It retails in price from $11 for the ¾ in. up to $40 for the 2½ in.

The Colador Kerosene and Gasoline Strainers

The Colador Engineering Corp., 276 Jackson Ave., Long Island City, N. Y., are manufacturing three sizes of gasoline and kerosene strainers for fuel line of auto-motor vehicles. These sizes are the ⅛ in., ¼ in. and ⅜ in.

The function of this device when attached to the fuel line of the truck is to prevent all dirt, water and other foreign impurities that may be in the fuel from passing any further.



Sectional View of the Colador Fuel Strainer, Showing How the Straining Screen or Basket is Attached to the Thumb Screw Cover-Cap.

The design of the Colador strainers is such that access to the strainer's screen or basket is readily afforded by attaching the basket to the thumb-screw cover top. A few turns of the cap unscrews this, and, together with the basket, the assembly is withdrawn, and can be easily cleaned of accumulated material. In cleaning, no dissembling other than the unscrewing of the caps need be done. The basket is cleaned simply by rinsing in gasoline or brushing with a stiff brush.

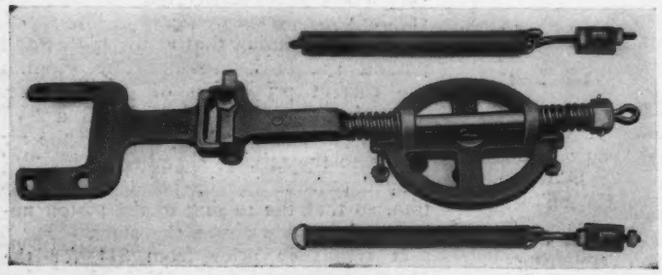
The basket is made of fine mesh phosphor bronze screen. There is a large trap with a spring-seat pet-cock at its bottom through which the dirt sediment and water can be drained off. A cast-bronze one-piece bracket is provided with each strainer for proper mounting.

The price for the ⅛ in. size is $3.

Behlen Quick-Hitch Universal Drawbar

A drawbar for attaching the Ford car to a two- or four-wheel trailer, not exceeding one ton in capacity, is being offered to the trade by the Chas. Behlen Son Co., Vine & 15th Sts., Cincinnati, O.

It is connected by removing the clip yokes or cross ties underneath the rear spring and replacing with a coupling, using the same clips. The saddle, with thumb and hexagon nut lock is thrown back to receive the hook, then brought forward and tightened. The round rod or journal made of 1-in. nickel steel is driven into the hook, and additionally secured by two rivets. The wheel is secured by a ⅝ king bolt and 2 hook bolts, insuring safety in case the load is not equally distributed. The lower fifth wheel has side bearings to fit snugly over a bar 2¾ in. wide by 2 in. deep. Two long coil springs prevent sidesway. These springs are fastened to the eye and run at right angles to the ends of the bed. This tension is secured by hook bolts with two nuts passing through the plates. It is made of malleable and nickel steel and sells at $20.



Drawbar for Light Trailer

Greist Covered Priming Cup

A foreign matter excluding provision is included in the new Greist Priming Cup produced by the Greist Mfg. Co., New Haven, Conn. The compact smallness of this covered priming cup is due entirely to the adaptation of the needle valve principle.

The New Greist Priming Cup is Covered, Preventing Foreign Matter From Gaining Ingress to the Combustion Chamber.

Accurate valve seating is made possible by the use of a floating nut. As may be seen in the illustration, this cup is provided with notches for a cross strap, which is tapped for the reception of the valve stem. The stem is provided with a thread near the cap and also near the valve, with a relieved intermediate portion. Thus when the valve is opened for priming the stem is raised and the cap tilted sideways. The thread near the valve acts as a safety device, preventing the unconscious removal of the entire stem. No springs are used. The Greist cup is also made in the open type.

Replacement Coils

The New York Coil Company, 338-40 Pearl St., N. Y., is offering a complete line of replacement coils to the automotive trade especially designed to be attached immediately without the need of machine work of any nature on any make or model of truck.

These coils are designed to fit and work in conjunction with the kind of ignition system in use on the job. The windings condenser and resistance units, it is claimed, are so proportioned that an extremely powerful spark is delivered under all operating conditions.

One of a Complete Line of Coils Put Out by the New York Coil Co. for any Make or Model Truck.

A chart showing the proper coil that should be ordered for a specific truck, together with other valuable information, may be obtained from the manufacturer upon application.

United States Rubber Co. Announces New Tire

A new, big, single, solid tire for heavy duty trucks carrying up to six tons to a wheel has been announced by the United States Tire Co., 1790 Broadway, New York City. The most interesting features claimed for the tire are that its design insures the elimination of the chief cause of internal friction, provides for the dissipation of frictional heat, and also makes possible a more perfect vulcanizing of all parts of the rubber.

This new tire, known as the Monotwin, will be made in sizes from seven to fourteen inches.

This tire is a huge single with an especially massive rubber body. Deep depressions occur at regular intervals in the center of the tire. It is made of grainless rubber. The alternative cross bars and depressions give the tire a non-skid quality. The bottoms of the depressions go down deep into the heart of the center of the tire and below the point where the tire is worn to the limit of its serviceability. The tire, therefore, retains its original qualities throughout its life, and does not require regrooving. The shape of the depressions is such that stones and other foreign matter cannot lodge in them.

The contour of the wearing surface of the tire and of the depressions is said to be such that, as the tire wears down, more and more tread surface is exposed to the road so that the load-carrying capacity is uniform throughout the life of the tire. Moreover, the composite nature of the tire makes possible its use either as a wide single or in place of duals.

Salient Selling Points, and Buyer Considerations From Veteran Truck Salesman

C. W. EVANS, veteran truck salesman for several years with the Nash Co., has accumulated many original ideas about selling trucks through years of direct contact with the most tardy unresponsive of buyers and intercourse with competitors. He says among other things:

"Truck salesmen have a certain handicap in disposing of motor vehicles of which those who handle passenger cars are exempt. The latter are enabled to secure greater results from their advertising, due to the fact that women and children are attracted to the salesrooms through such a medium. It is the wife, or son or daughter, who frequently buy the car before the husband or father has been won over. The men who sell trucks and tractors, are minus this aid. They must deal exclusively with the head of the family and must, in fact, overcome, in many instances, the opposition of the wife and children. The truck or tractor salesman, who wishes to dispose of more machines than his competitor, therefore, must adopt progressive and aggressive methods. He dare not depend upon prospects walking into his salesrooms. He can not rely only upon advertising. Instead, he must follow the scriptural injunction which suggests going out upon the highways and byways and compelling them to come across.

Cultivate Worthy Acquaintance

I have found that a very fruitful and effective method of locating prospects is to become acquainted with every banker. Most of them will tip off the names of those who are likely to buy a truck and who have the means of financing one. I also seek out men with a large acquaintance among men at the head of manufacturing institutions or in the rural districts and ask them for the same information. Writing to highway commissioners and following up with energetic campaigns has proved successful in many instances. Manufacturing cities are the best field for motor trucks and, unless the dealer is blessed with numerous plants of this kind in his vicinity, he had better devote his energies to the rural districts. Before going after a prospect, study him and his needs carefully. Many salesmen make a mistake in trying io sell a truck that is not properly adapted to the requirements of the patron. Miss a sale rather than endeavor to dispose of a one-ton truck to a man who should take a two-tonner. Avoid making a patron dissatisfied with his investment. He will prove a costly knocker.

To sell trucks to the farmer, the salesman must drive right up to the barnyard and have the machine properly equipped if he wishes to win the favorable attention vital in paving the way to a sale. A body should be provided which will fit into the needs of the agriculturist at the psychological moment. If stock is to be moved, the rack body should be in place. If grain, the dump body, etc. Give the farmer a practical demonstration right on the ground, and you have a chance to win him over. The most successful truck salesmen in Illinois are to be found in the villages. This is due to the fact that they are in closer touch with the farmers and realize the advantage of driving over to his farm and showing what a truck can do off the roads. Put in a complete line of bodies, study the needs of every farmer and go after them. Never wait for them to come into your salesroom. Move the salesroom out upon the farm and you will secure your results. Salesmen too frequently make the mistake of exaggerating the capabilities of their truck. The wise man advises his customer to avoid overloading. A truck rated at two tons should never be given more. While there is practically no limit to what a truck will haul if trailers are attached, it is imperative that the truck itself be restricted to what it is rated. Point out the reasons why and avoid the disastrous results of distrust and dissatisfaction.

It is also true that too many truck salesmen endeavor to sell a vehicle for work that properly should be handled by a tractor, and vice versa, too many tractor salesmen endeavor to convince their patrons that their machine can do the work that properly belongs to a truck. Both make a serious blunder. The truck and tractor each has its respective field. The farmer needs both. A truck will not handle a plowing or similar job where slow movement is imperative, while a tractor will not give satisfaction for a haul where rapid movement is essential.

The revolutionization of the truck business for rural needs through the advent of the pneumatic tire with its big, beaded tire, ensuring greater traction, is just what is needed on the farm or for hauling on muddy roads. Again, the salesman must study his prospect and suggest tires in accordance with the needs. If in the city where pavement conditions are adapted to a solid tire, that style should be advised. If the hauling is over streets where the big tires are more effective, the latter style should be recommended. The same is true in the country. Let the tire as well as the truck body fit the conditions to be encountered. This makes satisfied patrons.

Trucks are going through the same transformatory periods as did the automobile. Improvements are being added constantly, all designed to promote efficiency. A new device, that of a winch, by which stumps can be pulled out with the aid of a truck, has an appeal to farmers who have such obstructions upon their land. In many other ways can the truck be made to win its way into the farm barn if the alert salesman is properly on the job. Show him, when hauling oats, that the truck can make two trips to one for the horses. Haul a load of stock to the market or railroad station and demonstrate how much quicker the haul can be made than with horses and the many advantages in the avoidance of shrinkage and higher values.

Encourage Dealer Fraternities

One big lamentable neglect is the absence of whole-hearted fraternization among truck salesmen, as well as among local dealers. It is too often the case that salesmen and dealers seek to discredit their rivals or competitors. This is a great mistake and the entire industry suffers. Let the traveling salesmen, territorial representatives and local dealers get together and be friends. They can help each other in many ways, and at the same time help the industry. One salesman may not be able to handle a certain customer, but the line of a competitor might be better adapted and the sale might be made. Such a favor may be returned at some future date. An exchange of experiences at intervals may prove helpful to all salesmen and dealers.

We need more of this spirit of fraternity and co-operation, and it is vital to abandon the practice of belittling a rival and his wares and methods. A sale was never made through slurring a competitor or the machine he represents.

The Automobile Abstract Co. of America., Inc., 15 Park Row, New York, proposes to investigate, abstract, and guarantee titles to automobiles and motor vehicles, along similar lines to those of real estate title guarantee companies. It is claimed that $30,000,000 worth of motor vehicles are stolen each year.

American Motor Express Co., in the Southwest, Effectively Covers the Large Network of Routes That Make Up Its Transporting Radius.

Note the specially built body on this Patriot truck.

An Interesting Letter for Dealers to Read*

To the Editor:

The Owners' Transportation Company, with headquarters at San Jose, Calif., is owned and operated by S. G. Teter and M. R. Monze, who started this line between San Francisco and San Jose 19 months ago, hauling various freight under contract with the shippers in competition with the railroads. Any comparison with the railroad movement and motor truck movement is entirely in favor of the motor truck.

It is rather difficult to state definitely as to the range in which the motor truck can compete successfully with the railroad. One of the principal things to consider is the return haul and the elimination as far as possible of the operation of the motor truck without a full load. Speed and service are the prime factors which induce the merchants to use the motor truck in preference to the railroads. They are willing to pay a much higher rate, but satisfactory service must be maintained or the railroad will get the business on account of the lower rate. The Owners' Transportation Company's rates are based upon the top rate given by the railroads, plus the cartage at one end, thereby saving the merchant about a dollar and a half per ton and the service rendered is about eight hours instead of two days or even two weeks on the railroads on a short haul of 50 miles. In other words, the merchant can order his goods in the morning by telephone and receive them in the afternoon of the same day, while if shipped by rail he will be lucky to get them in two days or longer, according to the congestion at the depots.

There is another important thing which the merchants consider, and that is breakage, due to the extra and rough handling, when the goods go by rail. The packing or crating of goods is another thing to consider, as the breakage is fully 25 per cent less by motor truck. Other costs, such as tracing shipments, entering claims, charge of boxing, extra men for hauling goods, are all practically eliminated by motor truck hauling. Some authorities claim this extra cost will run as high as 20c per 100 pounds. In this section a tremendous increase in motor truck haulage has been witnessed during the past year. Competition is becoming very keen, and it is merely a matter of "the survival of the fittest."

The Owners' Transportation Company started with just one 2-ton truck and after a month's operation secured sufficient business to warrant an additional 2-ton truck and trailer. Some three months later we added three larger trucks and trailers, and one year of operation found us using fifteen trucks and trailers. We are not what is known as a common carrier, but consider ourselves as contract haulers, thereby we do not come under the jurisdiction of the Railroad Commission other than that we are required to file our schedule or rates. Experience has been that those who have been operating under this commission, whereby they have to make regular runs on regular routes and live up to other restrictions, have been unable to exist Motor trucks must move under load both ways or they cannot be made to pay at the low rates that transportation companies are forced to haul the goods. California laws are very drastic, and there are some counties and towns that put on exorbitant licenses and taxes which makes the operation of a motor truck almost prohibitive.

One town passed an ordinance licensing motor trucks $200 per year for coming into their town. One county passed an ordinance demanding $40 per ton capacity per year, and restricts the loading to not over 7½ tons, including the weight of the truck, therefore, a five-ton truck will be ruled off of the highway in that county.

Transportation by motor truck is in its infancy, and it is a case of pioneering at the present time. Putting pneumatic tires on a motor truck does not make it a truck adapted for the transportation hauling where one requires speed and tonnage. It must have a special engine, transmission, brakes, springs, and be made of lighter but stronger material. After investigating a number of motor trucks, which have been in operation on the Owners' lines for a period of a year, Mr. Teter went East to have a truck fitted specially for this particular service. The Armleder truck was selected, as it came nearest to filling the requirements, and after a few changes in the design a special truck was brought out to meet the demands of our service. In view of the fact that the Owners' are extending their lines to Fresno, a distance of 175 miles, and a speed truck was necessary for this extension, Mr. Teter signed a contract with the Armleder people to be their coast representative. The trucks which will go on the Fresno run will be pneumatic equipped and have a speed of 30 miles per hour. They will be operated without trailers. The bodies will be equipped with bunks so that one driver can sleep while the other drives, as these trucks will be required to make a round trip every day, covering about 350 miles. The rates charged for this service will be a little less than the present express rates, and considerably higher than the freight rates, but the merchants demand quick service, and are willing to pay for it.

A complete record of costs is kept on each truck. The record on a 2-ton truck and trailer capable of hauling 7 tons each trip on solid tires shows that the cost for gasoline, oil, repairs, garage, etc., for a 55-mile haul per day, working 25 days per month, is $125 per month. A four-ton truck and trailer hauling ten tons per load over the same route shows a cost of $135 per month for the same items. This shows 7 miles per gallon for the two ton and 5 miles per gallon for the four ton, gasoline selling at 21c per gallon in this country, while oil sells for 30c per quart. The cost of operating a two-ton truck, including every known cost, such as depreciation, interest, taxes, tires, insurance, etc., is 16c per mile. A three and a half ton truck costs 21c and a five-ton truck costs 25c per mile, while a trailer costs about 9c per mile on the average. Baring accidents, the trucks on the highway hauling between San Francisco and San Jose are earning on an average of $800 per month each.

Experimenting with pneumatics on a two-ton truck over a period of eight months show that the truck is capable of making twice the mileage at practically the same cost per day, as far as the gas, oil and repairs are concerned, compared with solid tires on the same kind of a truck and like capacity. Of course, the round trip shows about the same tonnage as hauled by the solid tired truck making one-way trip per day as the pneumatic truck does not carry a trailer and the solid tire does. The only real advantage of the pneumatic over solid on a 50-mile haul is that it gives better service in matter of hours and minutes, and this is what the merchants demand.

The Fresno line will be entirely on pneumatics, as the distance is so great that the solid-tired trucks cannot make the time necessary to get the business. It is estimated that the trucks operating on this run will be capable of earning in the neighborhood of $2000 per month by making a round trip each day. California roads are the finest in the world for motor trucking, and the fact that all roads are made of concrete and asphalt between these cities makes it possible to put on these long-distance routes. Any one contemplating the establishing of a motor truck transportation line should bear in mind these things which make it necessary for success:

Sufficient capital.
Proper selection of route.
Length of route.
Road conditions.
Existing agencies of transportation.
Public regulation of truck service.
Frequency of service.
Selection of equipment.
Selection of drivers.
Collection and delivery methods.
Business methods.
Developing business.

Don't think you are going to get rich the first year, as you will be very much disappointed if you do. There is a lot of grief and hard work connected with the transportation business.

S. G. TETER.

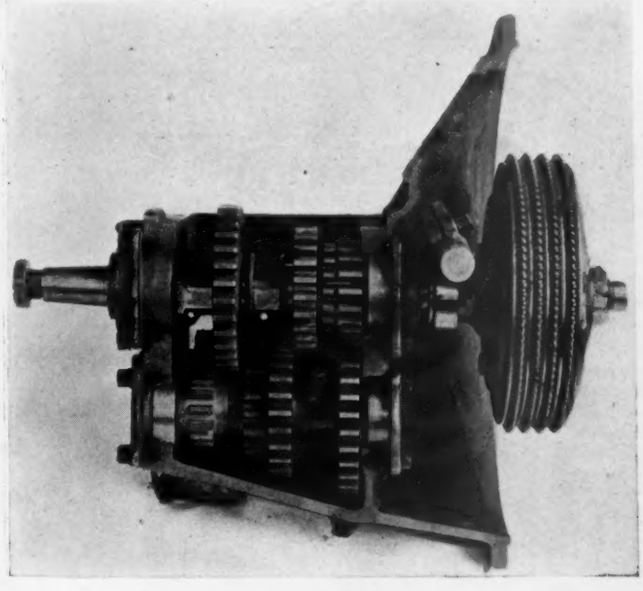
*Many dealers are prone to sell trucks to prospects desiring to establish a transportation line without going into the subject fully. This letter contains some pertinent remarks which every dealer should keep in mind.

SERVICE AND REPAIR DEPARTMENTS

Conducted by C. P. SHATTUCK

Proper Procedure for Disassembling, Adjusting and Assembling the Brown-Lipe Model 30 Transmission Unit*

THE following methods are those employed at the factory of the Brown-Lipe Gear Company, Syracuse, N. Y., for disassembling, adjusting and reassembling the control sets, clutches and three and four-speed transmissions of the unit type manufactured by this company. These are known at the factory as models 30, 35 and 50. Models 30 and 35 have ¾-in. face gears, while the gears of model 50 are 1 in. in width. Ordinarily, the different models can be identified by the number of driving disks in the clutch, the 30 having four, the 35 five and the 50 six. There is a driving disk, the plate of which is faced on each side with asbestos fabric, for each plain, hardened steel driven disk. The driving disk has teeth cut in its periphery or outside edge. The various models differ slightly, but the following directions, which cover the model 30, apply in large part to all unit power transmissions.



A Cutaway View of Three - Speed Transmission With Clutch.
The cover with shifter forks and pull rods has been removed.

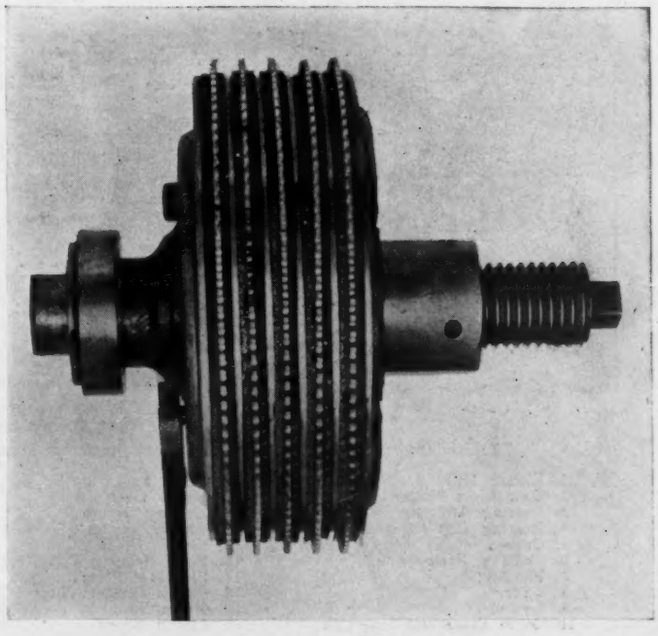
How to Remove Bolts from Housing

After disconnecting propeller shaft and brake rod clevis from hand-brake lever, **unbolt transmission housing from engine** and pull the unit out. **The top bolt should be the last to be removed,** as this practice eliminates danger of bell housing flange being cracked by leverage. The clutch will remove with the transmission, but the clutch drum will remain as it is bolted to the engine flywheel. **Remove cotter pin, castellated nut and lock washer on brake quadrant,** using a ½-in. open end wrench. **Remove cap screws (2)** 5-16 in., **and lock washers** securing brake bracket. **Displace cotter pin from brake lever pin and lift off brake assembly.**

Removing Transmission Cover

Remove cap screws (8) in transmission cover and lift off cover, with control lever undisturbed. The shifter forks and pull rods are now accessible. To disassemble cover remove **poppet plugs (2), poppet springs** (2) and poppets (2). There is an interlock in this assembly, but it need not be disturbed. Care must be taken, however, to see that it is between the pull rods in the reassembly.

The next step is to unlock the shifter forks from the pull rods. **Remove cap**



Showing the Clutch Removed From Driving Drum.
To remove drum bolts from pressure plate and spring ring, springs must be compressed. The factory tool for this work is shown at left and wrench indicates necessary space between head of bolt and pressure when removing bolts which lock in a slot in pressure plate.

*Complete and illustrated directions for disassembling, adjusting and reassembling the main frame or amidship types of transmission and clutches employed will appear in the July issue.

screws and lock washers from forks. Move control lever to one side, as shown in an accompanying illustration, and **pull out pull rod.** Again move lever and **remove other pull rod. Remove shifter forks.** In the event it is necessary to remove brake lever proceed as follows: **Remove pin above collar** on lever. The collar, spring and cup can now be slid upward, affording access to the lock pin securing the lever shaft to the cover. **Drive out pin and withdraw lever.**

Remove cap screws (2) and lock washers of clutch shifter or throwout yoke. On the exterior of the housing, on either right or left-hand side, depending on the location of steer, will be found the locating screw for clutch shifter shaft. This is a slotted screw with a lock nut. **Loosen lock nut and remove screw. Drive out shafts from shifter.** There are two shafts, a long and a short one.

Removing Clutch From Shaft

The next step is to remove the clutch. **Remove cotter pin from nut** on shaft. **Remove nut and clutch collar.** The clutch is fitted on a taper shaft and is keyed to the shaft. The best way to remove the clutch is to loosen the four cap screws securing the bearing cap on the rear end of the transmission. Back screws out about one-half inch. Tap the clutch end or taper end of shaft with a lead or rawhide hammer. This will start clutch off the taper. **Remove clutch as a unit.**

The clutch is easily disassembled and reassembled, as the construction is simple. As removed from the shaft its components are: drum with six keys riveted to it, fabric-faced driving disc, driven disks, having hardened steel plates, a spring ring, pressure plate, two coil springs, three bolts, release sleeve and a bearing. These components are shown in an accompanying illustration.

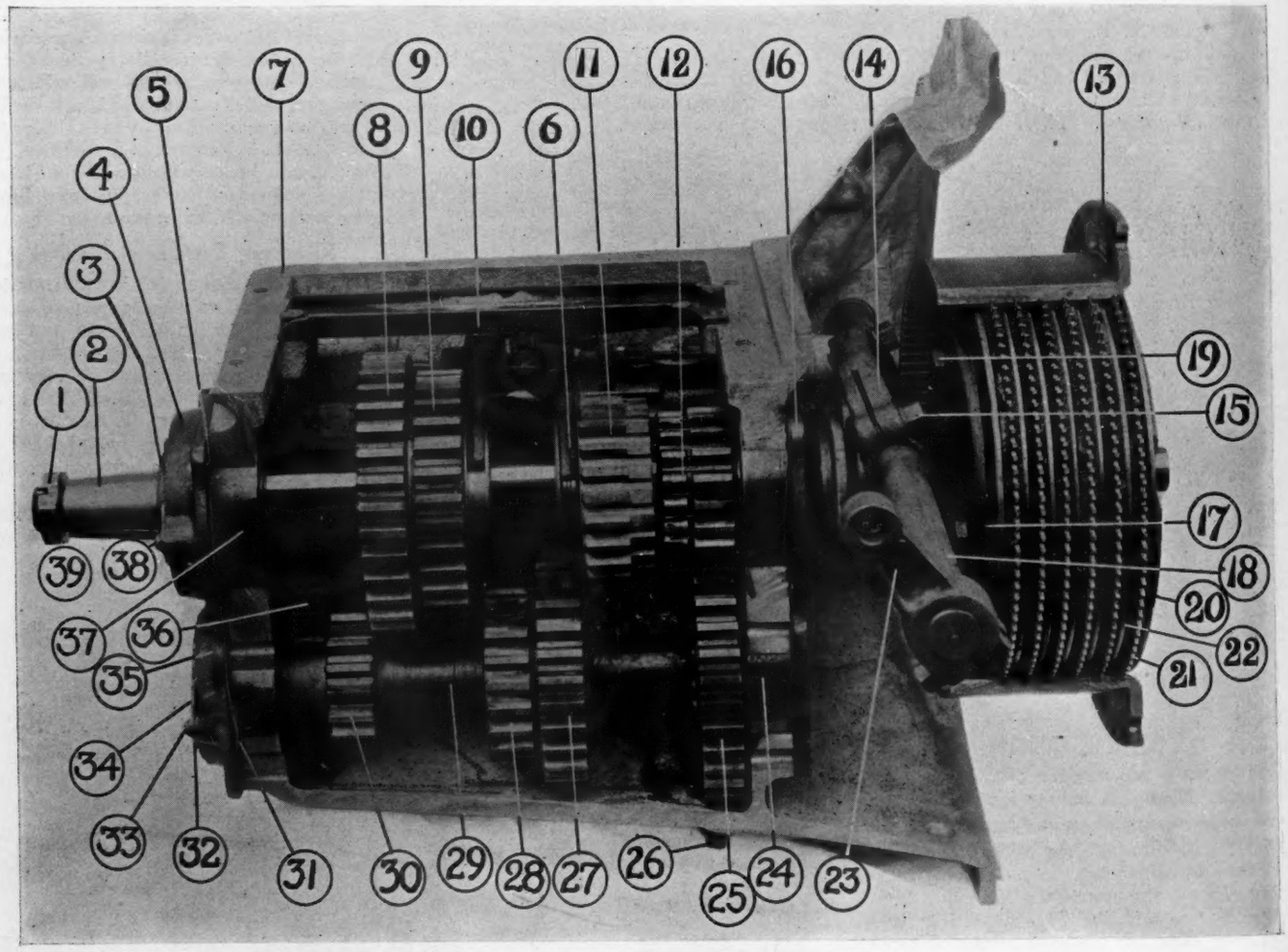
Disassembling the Clutch

To replace a disk it will be necessary to disassemble the clutch. The first step is to relieve the tension of the inner and outer coil springs. A special tool is employed at the factory, and it is screwed on to the spring ring end of the clutch shaft as shown in an accompanying illustration. Use may be made of an arbor press, however. **Place clutch with spring ring uppermost in the press** and place a block of wood on the spring ring. The block must be less in width than the external diameter of the ring. Compress until heads of bolts extend beyond surface of pressure plate. It will be noted that the bolts have bosses or lugs on the inner side of heads and that the pressure plate has slots or recesses. These lock the bolts. In adjusting the clutch a BOLT MUST BE TURNED THROUGH 180 DEGREES OR GIVEN A COMPLETE HALF TURN. Reference will be made to this feature in the instructions for the adjustment of the clutch.

Removing Spring Plate, Etc.

Remove the three drum bolts. Release press and **remove spring ring and pressure plate. Remove inner and outer coil springs.** Lay drum with disk flat on bench and **lift off disks,** starting with a fabric-faced driving disk, next a steel plate driven disk, etc. The last disk to be displaced will be a driven disk.

If it should be necessary to remove release bearing or release sleeve, care

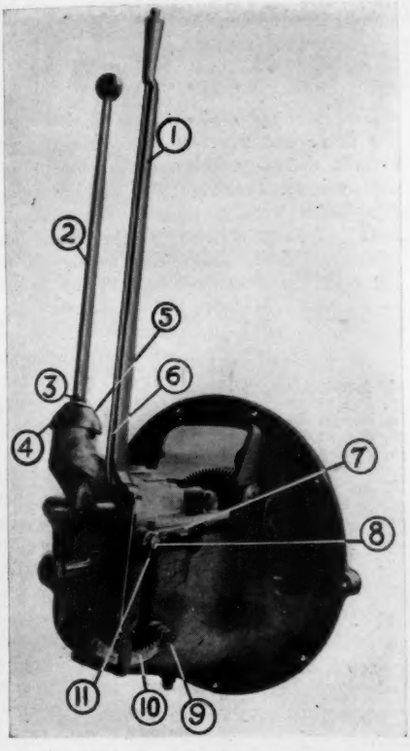


A Four-Speed Unit Cut Away to Show Correct Assembly of Gears, Etc.

The driving drum, which is bolted to flywheel, is shown in section, and the shifter or clutch release mechanism is also illustrated

1. Flange Nut
2. Rear Main Shaft
3. Bearing Adjuster
4. Bearing Cap
5. Gasket
6. Shifting Fork
7. Housing
8. First
9. Second
10. Guide Plate and Interlock
11. Third and Fourth
12. Guide Gear
13. Driving Drum
14. Clutch Shifter
15. Bolt
16. Main Bearing Cap Front
17. Pressure Plate
18. Clutch Shifter Shaft
19. Drum Bolt
20. Clutch Drum
21. Driving Disk
22. Clutch Drum Disk
23. Clutch Release Arm
24. Bearing
25. Fourth
26. Drain Plug
27. Third
28. Second
29. Countershaft
30. First
31. Gasket
32. Lock
33. Cap Screw
34. Bearing Adjuster
35. Cap
36. Reverse Gear
37. Bearing
38. Cap Screw
39. Bearing Cap Lock

must be taken in the replacement of these members. The sleeve has an external thread and screws into the hub of the pressure plate. The bearing is mounted on the sleeve after being packed with heavy grease. **In placing bearing on sleeve the side of bearing marked "thrust" must face towards the pressure plate.** Examination should be made of the keys in the drum, and if these are badly worn replace with new. The rivets may be sheared by driving out the keys. In fitting new keys see that the countersunk holes are on outside of keys and in riveting make sure of a flush surface so that disks will not bind. Use ⅛-in. rivets.



The Control Set of Brown-Lipe Transmission and Clutch

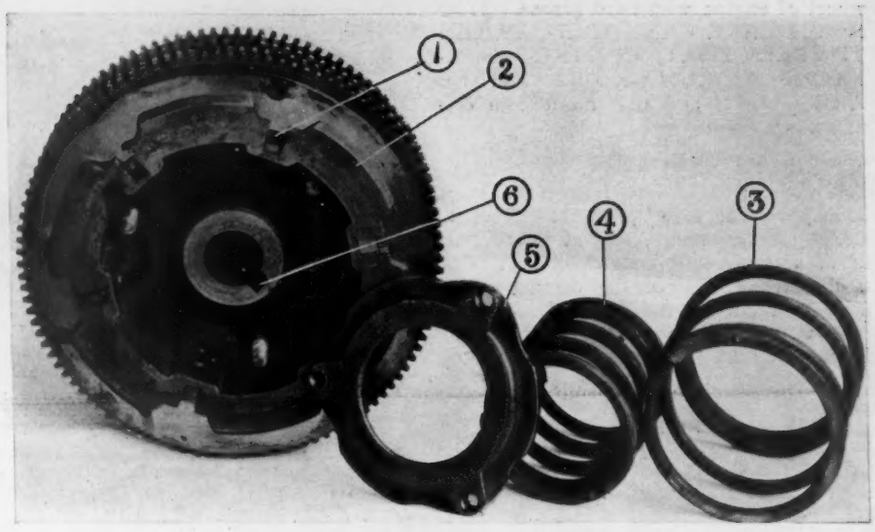
The hand-brake lever assembly is removed as a unit by removing bracket from case. Displace brake quadrant nut and cotter and cap screws of bracket

1. Brake Lever
2. Shifting Lever
3. Collar Pin
4. Collar
5. Cup
6. Rock Shaft
7. Bracket
8. Brake Lever Pin
9. Nut
10. Brake Quadrant
11. Cotter

Disks should be kept clean during the reassembly. In replacing disks make sure that they move freely and easily, particularly if new disks are used or new keys fitted. Smear the plain disks with 600 W. The first disk to be replaced is the plain one, next is a fabric-faced member and so on. The last disk should be a fabric. **Replace pressure plate, inner and outer coil springs and spring ring. Replace drum bolts.** TURN EACH BOLT UNTIL THREADED END IS EXACTLY FLUSH WITH THE SURFACE OF SPRING RING. **Replace clutch collar, nut and cotter pin the nut.**

Adjusting the Clutch

The adjustment of the clutch for slipping is by removing the hand-hole cover and turning each of the **three drum bolts**



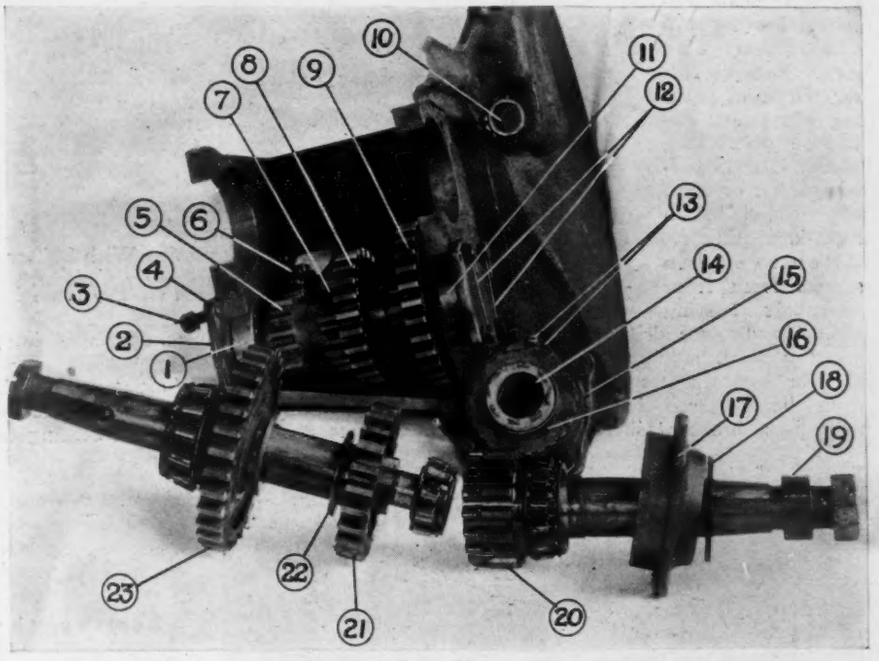
Showing Disks on Drum and Bolts Extending Through Pressure Plate

The spring ring is shown displaced with inner and outer coil springs which are slipped over hub of drum in the reassembly

1. Key
2. Drum
3. Outer
4. Inner
5. Spring Ring
6. Keyway

one-half turn at a time to the right. A click will be heard, indicating a half turn. If the clutch continues to slip, turn each bolt through another 180 degrees. If maximum turning of the bolts does not remedy slipping, an extra plain steel plate or driven disk may be added. It should follow the first disk in the reassembly of the disks on the drum. It may be that the driver of the truck has attempted adjustment of the clutch and has turned one bolt more than the others. If this be suspected it is suggested that the clutch be removed from the engine and all three bolts be unscrewed until their threaded ends are flush, as previously described, and readjustment made.

In the assembly at the factory use is made of the driving or flywheel drum to make sure that the disks move freely in it. Before replacing the clutch and transmission **repack pilot bearing in fly-**



The Speed Transmission With Mainshaft Removed From Case

The shafts with gears and bearings are shown in their order of assembly. The bearing cap shown removed is the adjusting member and supports the right-hand shaft. Note clutch shifter shaft bushing in case

1. Countershaft Bearing
2. Rear Bearing Cap
3. Cap Screws and Washer
4. Gasket
5. Reverse
6. Idler
7. First
8. Second Speed
9. Countershaft Drive Gear
10. Clutch Shifter, Shaft Bush
11. Bearing
12. Lock Wires
13. Bearing Cap, Lock and Screw
14. Packing Box Gland
15. Rear Bearing Cap
16. Bearing Cap Lock Plate
17. Front Bearing Cap
18. Brake Washer
19. Clutch Collar
20. Drive Gear
21. Second and Third
22. Rear Main Shaft
23. First and Reverse

wheel of engine with hard grease. TOO MUCH CARE CANNOT BE TAKEN TO SEE THAT CONTACT SURFACES OF DRUM AND FLYWHEEL ARE CLEAN and that no foreign elements are present.

Cause of Dragging Clutch

If the clutch fails to release or drags it may be due to a split or torn fabric, sticking disks, failure to tighten driving drum securely to the flywheel or failure to clean the seat of the driving drum and the recess in the flywheel to which it bolts. Rusted or sticking disks should be cleaned with kerosene.

Disassembling Transmission

Directions have been given for the removal and disassembling the cover, removing the shifter forks and pull rods of the model 30 transmission. To disassemble the transmission proceed as follows: **Remove four ⅜-in cap screws from the rear mainshaft bearing cap. Remove bearing cap assembly and the square shaft as a unit.** Shaft can be started by tapping against the universal flange (this flange is left on when transmission is removed from a truck) or by the use of pinch bars under flange of cap. **To disassemble rear bearing cap, remove cotter pin, castellated nut and universal flange** from square shaft. **Remove bearing cap assembly from shaft. Remove bearing cap lock screw and lock. Remove cotter pin from packing gland nut. Remove packing gland.** Use a special spanner or drive off. Gland has a right-hand thread.

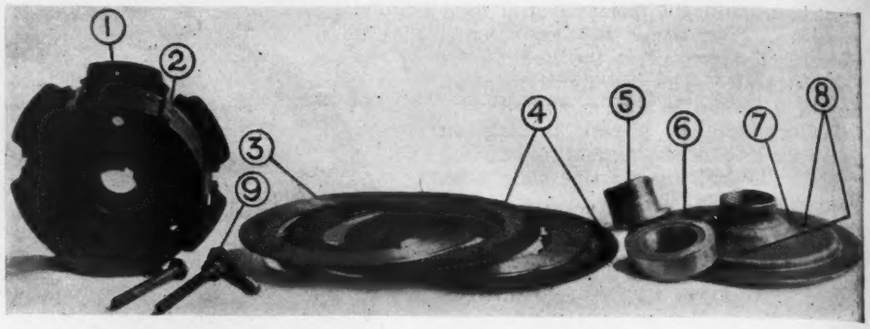
Remove cap screws from front mainshaft bearing cap. To **displace drive gear with shaft** insert a small pinch bar on either side of gear between it and the case. The front bearing cap has a gasket and there is a brake washer outside of the cap on the shaft. The drive gear can now be lifted out through top hole in case. **Remove front bearing cap.**

Both shafts are supported by Timken adjustable roller bearings and the inside end of the rear shaft carries a Timken cone which fits into the end of the drive gear. These units and their order of assembly are shown in an accompanying illustration.

To remove countershaft proceed as follows: **Remove cap screws (4) and lock washers of rear countershaft bearing cap.** Shaft is supported by a radial bearing. To **drive out bearing** first turn the gear until a slot in it gives access to the edge of the inner bearing race. Drive against this edge with a punch. **Remove lock wires (2), cap screws (4) and front bearing cap. Slide shaft backward, tilt and lift out.** If front bearing sticks in case place a small pinch bar on either side of the shaft between the large gear and the case, and force out the bearing.

To remove the reverse gear **back out the idler stud.** The gear rotates on a bushing mounted on a steel stud. The stud is locked in place by a boss or lug on the rear bearing cap of the countershaft. In replacing the stud it must be so turned that one of its faces parallels the boss of the cap. The stud cannot be removed before the cap, and the stud is replaced before the cap is replaced.

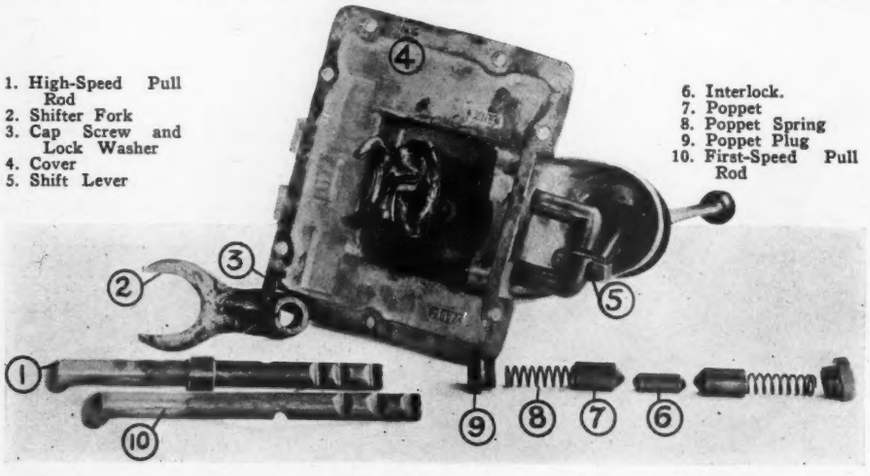
There are four gears on the countershaft and these are pressed on and prevented from rotating on the shaft by keys. Use of an arbor press will be necessary to remove and replace the gears. **To reassemble gears** on shaft **place a medium length key on one end of the shaft. Press on third largest gear** to about center of the shaft and **drive the key its full length into the gear. Slip spacing washer over shaft** on flush side of gear. **Press on first speed gear** until flush side is tight against washer, and drive key full length into gear. **Place long key in** keyway, next to first speed gear, and **press on small gear,** with its long hub side inward. As thus assembled, the small gear hub should overhand the shoulder on shaft about 1-32 in. Now reverse position of shaft and **slip spacing collar over shaft. Place short key in keyway** and **press large (drive) gear on shaft, with flush side inward.**



The Plain Steel Disks Are Prevented From Turning on the Drum by Keys Which Are Rivetted to the Drum

The driving and driven disks and their relation to each other, the release sleeve, release bearings and pressure plate are also shown. Note the slots in pressure plate in which bosses in heads of bolts engage preventing bolts from turning

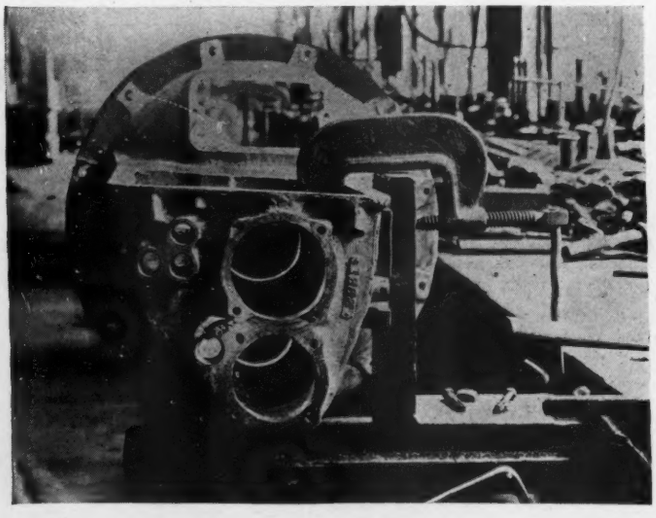
1. Drum
2. Key and Rivets
3. Drum Disks
4. Driving Disks
5. Release Sleeve
6. Release Bearing
7. Pressure Plate
8. Drum Bolt Slots
9. Drum Bolts



1. High-Speed Pull Rod
2. Shifter Fork
3. Cap Screw and Lock Washer
4. Cover
5. Shift Lever
6. Interlock.
7. Poppet
8. Poppet Spring
9. Poppet Plug
10. First-Speed Pull Rod

The Cover of the Three-Speed Transmission With Shifter and Pull Rods Displaced

The high-speed rod has a collar. The poppet plugs, springs, poppets and interlock are shown in their order of assembly in the cover



Showing the Special Stand and C-Clamp Used at Brown-Lipe Factory.

It comprises a horizontal extension attached to bench, and having an L-shaped member bolted to the extension.

How to Identify Pull Rods

All components of the transmission, and the case, should be thoroughly clean before beginning the work of reassembling. The presence of metal chips or dirt is to be avoided for these foreign elements are active abrasives.

Reassembling Transmission

To reassemble the transmission reverse the process of disassembling, but there are several precautions to be taken. The most important is in the replacement of the pull rods. There are two and both have three poppet notches. The high speed rod has two notches close together and one widely spaced from the others. On the low speed rod all three notches are equally spaced or equidistant. With the left hand steer unit the high speed rod goes on the left side when facing the engine, and on the right side for a right-hand steer.

The forks are interchangeable, but in slipping these on the rods be sure that the flat sides face the gears. In replacing cover it is necessary that the sliding gears be so moved that forks fit into the fork slots on the gears, and it is advisable to try action of the forks and gears before finally tightening the cap screws in cover. It is also important that the interlock be between the poppets in the reassembly, and that the poppets function properly.

Adjusting Bearings

The countershaft bearings should be so adjusted that the shaft rotates freely. A play of from .010 to .015 in. is permissible. An end play somewhat less than that allowed in countershaft is necessary for the mainshaft. In replacing bearing caps see that gaskets are in good condition, that lock washers are in place and that cap screws of front mainshaft bearing cap are locked with wires.

Lubricate the bearings with 600 W or oil as heavy as it and fill case until countershaft is just covered. The old lubricant should be removed at least once every 3000 miles, and the case flushed with kerosene, the cleansing fluid removed and new oil put in. If lubricant works out past the packing gland, tighten the gland. Occasionally put a few drops of oil in cups over clutch release shaft. On some models there are oil cups over the hand lever shaft bracket of the control and these should receive lubricant from time to time. On one type of left-hand steer there is a grease cup over hand lever shaft bearing. This cup should be turned down every 500 miles.

Supplementary Suggestions for Care

The shifting rods have locks determining the correct alignment of the gears, and there is an interlock which prevents shifting of more than one gear at a time. These locks are spring tensioned poppets engaging notches in the rods. If gears fail to remain in mesh, unscrew the poppet plugs and inspect the poppet springs. If broken or weak replace damaged gaskets with new and make sure that face of cover and case are clean. It is suggested that the breather plug (screen member) in cover be removed and washed in kerosene whenever it becomes clogged. As previously stated, in replacing the transmission and clutch see that pilot bearing (on inner end of rear main shaft) is packed with grease and that FACE OF HOUSING WHERE IT CONTACTS WITH ENGINE HOUSING IS THOROUGHLY CLEAN AND BOLTS SET UP TIGHT.

Marvel Cylinder Reboring Machine

The Marvel Machinery Co., Minneapolis, Minn., recently introduced a new reboring machine known as model 6. This appliance, which is used in connection with truing worn and scored engine cylinders, should be included in the equipment of every modern repair shop. As it is entirely automatic, its operation is very simple. An automatic feed release is provided on both the forward and reverse bores, which can be set for the length of the cylinders to be rebored. The feature of this provision is the fact that it permits the operator to attend to other matters while the machine is reboring, making this appliance distinctly a labor-saving as well as a time-saving device. It is also supplied with centering cones which greatly facilitate the operation of centering and clamping each cylinder.

This machine is substantially constructed, practically eliminating any chattering of the cutting tool. As the tool overlaps itself on each revolution, it leaves a surface finish which is said to meet the demands of the most exacting machinists.

Each machine is provided with cutter heads covering the diameter capacity of the machine, and each cutter head is fitted with one roughing tool. A set of 6 special designs of finishing tools, made of quality high-speed steel, are also included as equipment.

A fibre filled friction wheel ¾-in. face by 4-in. diam., running on cast-iron friction disk 9-in. diam. provides variable feeds. Drive is obtained from tight and loose pulleys to spiral gears. The pulleys are 10 in. diam., and 2½-in. face. A tool pan 8 x 7 x 1 in. is another feature of convenience, and need that was considered in the construction of this machine. The Marvel has a boring capacity of 2½ to 8 in. diam. by 18 in. depth, or 20 in. depth, with automatic stop removed from feed rack. A gear ratio of 4.4 to 1 is provided. This machine is 47 in. high and takes up a floor space of 47 x 24 in. It weighs 760 lb. and requires but one-half horsepower for operation.

The standard equipments include 3 face plate reducing rings; 6 cutter heads with roughing tools; 6 finishing tools; feed rack retaining collar and ring; automatic stop with lock screw, clamping device; 3 centering cones; 1 machine crank, and a special screw driver.

Mosher Wrecking Truck

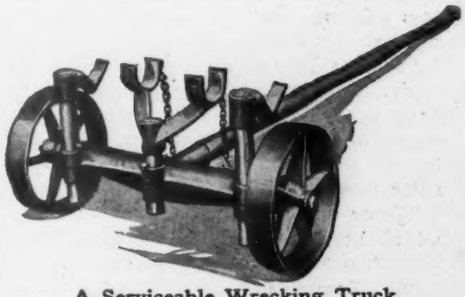
A device for towing a disabled truck or car to the garage for repairs is being announced by the Mosher Manufacturing Co. through the Zinke Co., 1323 S. Michigan Ave., Chicago, who represents the company's sales department.

It is simply constructed, contains no rivets and is sufficiently powerful to withstand severe service. Its design is so simple that it can be readily disassembled in a few moments.

The front end support of this device is provided with two heavy chains which may be secured to the springs of the disabled car, to prevent the possibility of side slipping. By reversing this end support, a swivel offset yoke, the towing pole can be raised to an almost vertical position. By pushing the pole down to a horizontal position, the truck rolls in on the axle, enabling one man to lift the disabled truck or car.

For rear-end breakdowns two-foot blocks are provided, each on a swiveled steel upright adjustable for height. These rear support blocks fit any axle, regardless of the presence of truss rods. The telescopic construction of the towing pole enables its adjustment to any length. This can also be entirely removed when conditions demand it.

The axle shaft is cold-rolled steel and revolves in roller bearing consisting of 12 rollers in each bearing.



A Serviceable Wrecking Truck

In the construction of this wrecking truck, the use of rivets has been eliminated, while it is stated to withstand the most severe service

Electric Metal Melter

A new solid constructed melting pot for use on the bench has been developed by the General Electric Co., Schenectady, N. Y. This electrically heated pot is especially designed for melting lead, babbitt and similar metals. Four short legs and a flange on the upper rim eliminate the danger of upsetting. The special flange also permits the placing of the pot in a hole flush with the top of the board or table in which it may be placed. It has a plug and socket fixture for attaching to the electric light circuit.

The heating element is a coil, wound around the container and extending from top to bottom to insure even distribution of heat and prevent undue temperature loss. It is automatically regulated, which reduces the amount of attention necessary for its operation.

In Spokane, Wash., the city has opened a free parking area under the elevator tracks of the C. W. R. & N., with room for 180 cars. A daily average of 160 automobiles are parked at one time, protected from the sun and weather without expense to owner, or limit of duration of stay.

What Happened When Tommy Studied Human Nature

Obtaining the Farmer's Confidence is One of the Necessary Requisites to Successfully Sell the Farmer. And It Takes a Little Energy to Do It

By C. P. SHATTUCK*

"AND," concluded Cal Emmett, traveling representative of the Yearrich tires, "it just goes to show that you can sell the farmer if you can get under his hide."

"Some hide, I'll say," retorted Henry Baker, manager of the tire department of the Pawtucket Motor Truck Company, who having had his monthly fight with Emmett over adjustments, and having come out second best as usual, was not in a happy frame of mind. "Say, Cal, the farmers remind me of your tires."

"I'll bite, what is it?" Cal was long on curiosity.

"Aw, figure it out and tell me the answer when you roll around next month. Maybe it will be as near right as your company is on adjustments."

A trifle peevish for Hen, thought Cal as he made his way to the office. Not like him at all. Wonder who's been rubbing his fur the wrong way? But the tire manager was not the only employee. Smith, of the used truck department, displayed signs of frayed nerves as did two of the salesmen. Even Miss Brown, J. G.'s secretary, was perturbed.

"Lo, Miss Brown. Why all the pussyfooting? Everyone seems as friendly as a mess of strange bulldogs in the garret. How's J. G.? Like to see him a minute."

"Better make it some other day, Mr. Emmet. Mr. Wilkins is having one of his investigations. He's just back from Florida and I guess things have not moved according to his ideas while he was away, and—Here's Mr. Wilkins now."

Public Not Interested in Troubles

J. G. greeted the Yearrich salesman in his usual cordial manner. J. G. had his troubles but did not believe the public was interested in them, and it was his policy to leave them in his private office.

"How is business, Cal? Hear you are putting over lots of big pneumatics. No getting away from it they are getting popular. Del Hawkins tells me that 70 per cent. of the orders on 2 tons and under are for the big shoes. By the way, seen Tommy lately?" Tommy was J. G.'s star salesman and had opened an agency up-State for the Providence line of trucks.

"Was at Tommy's yesterday," was the reply. And say, J. G., we have got to hand it to Tommy. He's certainly peddling out trucks to the farmers. He's got his place all fixed up and believe me it is some classy; there's a—"

"Come into my office, Cal, and tell me all about it," interrupted J. G. "Miss Brown, if anyone calls, I'm engaged."

"So Tommy's putting them over is he?," remarked J. G., as he pushed the humidor over to the tire salesman. "Mighty glad of it. That's more than my bunch can do," and J. G. eyed a bunch of reports and prospect slips on his desk. Rather explains the pussyfooting, thought Cal. Guess it has been a regular spring house cleaning.

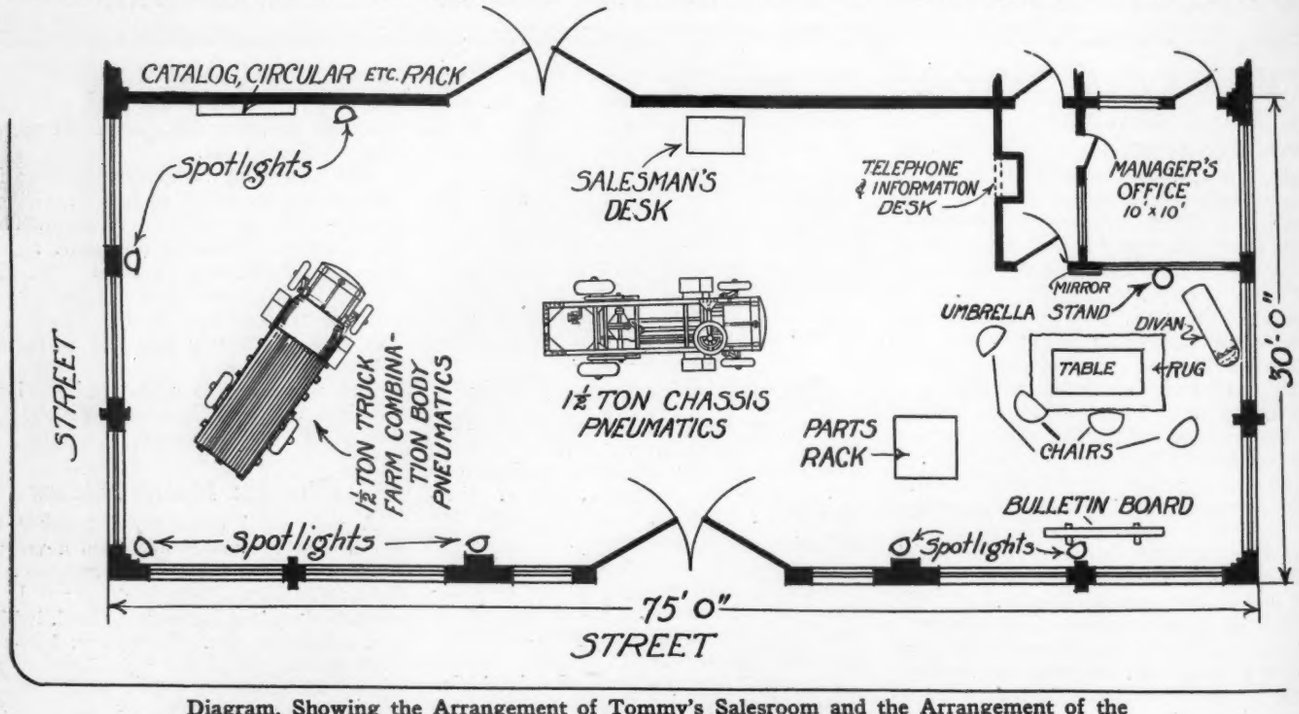
"Yes sir," Tommy's doing real business," replied the Yearrich representative. "He's got as fine a salesroom display as you will find anywhere and I don't bar the big towns. You ought to see it, J. G."

"I will. Let's run up in my car and give Tommy a call," said J. G., pressing the button for Miss Brown. To her he said "Have Jimmy bring around the car."

"Jimmy is out with the car," was the reply.

J. G. exploded. "I'll fire that boy. I've stood for his nonsense long enough," and as J. G. was about to make out the order of dismissal the door opened and the subject of J. G.'s wrath entered, followed by Del Hawkins, sales manager of the Pawtucket truck factory. Jimmy, with his usual disregard for his employer and consideration for the tips of Hawkins, had run to the depot for the latter.

J. G. was glad to see Hawkins and said so. Jimmy was just about to make his escape when J. G. remarked that if it would not inconvenience him he would like to run up to Tommy Williams' place. "Sure," replied the incorrigible Jimmy. "I'll fill up the old boat with gas and oil. No troub'e at all," and J. G.'s chauffeur disappeared with a wink at Del Hawkins.



Diagram, Showing the Arrangement of Tommy's Salesroom and the Arrangement of the Corner Made Comfortable for the Farmer's Folks

Although it was a small town, Tommy believed in burning plenty of electricity and the use of several spot lights for concentrated illumination of his trucks

*Editor's Note. This is the third of a series of articles by Mr. Shattuck, dealing with the problems of the new truck dealer. The fourth will appear in an early issue.

Twenty minutes later the trio were on their way. Entering the county in which Tommy was established there was evidence of Tommy's activities, for they began to note Providence trucks equipped with Yearrich pneumatics, all of which pleased Cal Emmet; that is, the tire end, and he said so. Presently Del Hawkins called J. G.'s attention to road signs eulogizing the Providence farmer truck. **"Put Your Trust In a Providence Truck and It Won't Fail You,"** read one, while another bore the inscription, **"We Don't Sell You a Truck, We Sell You Service."** Another read **"When In Westerly Meet Billy Stebbins."** Further on this sign greeted the eye: **"If Tired After Shopping Rest Yourself at 180 Main St. Comfortable Chairs, Good Reading and Conveniences for the Women Folks. All Welcome."**

"Some pep, what?" remarked Cal Emmett. "That's getting off of the old stuff, I'll say it is. Tommy's got the whole county plastered with those signs.

J. G. was about to comment when his attention was diverted to a truck in a nearby field. The driver appeared to be having difficulties, so J. G. signalled Jimmy to stop. The trio got out and walked down to the field. A farmer was at the wheel of the truck and beside him was what appeared to be his son. The ground was soft, frost was coming out, and the truck was well loaded. After the farmer failed to get the truck under way the young man took the wheel. Instead of dropping in the clutch he began to talk to the older man. J. G. was for going in the field to hear the conversation but Del Hawkins balked. He had no desire to plaster his footwear with mud and said so.

" Bet they don't get out," he remarked.

The Human Equation and Sales

"Make it dinners and include Tommy and you're on," came back the Yearrich man. It's a cinch. That truck's got our ground hugger tires on and she'll come through." And the truck did, but instead of pulling out of the field the young man turned the truck around and stopped it. The farmer then got in the seat and after a few unsuccessful attempts got the truck under way and pulled into the highway, where J. G. discovered that the young man was Tommy's salesman, Billy Stebbins. The latter greeted J. G. and his companions, whom he introduced to the farmer. "Gosh, but them 'ere trucks and big tires are all right when you get hep to 'em," remarked the son of the soil. "Thought Billy was trying to put something over on me when he said the truck would go through any of my fields so I took him up. And she did, by gum, and I took her through myself," and he swelled with pride. "I'll take her, Billy. Come up to the house and get your check."

A mile outside of Westerly Jimmy overtook a truck rolling along and he signalled to pass, but the driver of the truck promptly took the center of the narrow highway and held it. Jimmy nearly discharged the battery using the horn and the atmosphere was charged with a bluish tinge. "Some artistic cusser, your driver, J. G.," remarked Del Hawkins, "but I don't blame him."

Finally the truck driver signalled "stop." He got down from the cab and when he faced J. G.'s car he proved to be Tommy Williams. "Had your goat, didn't I, Jimmy? Saw you coming in my rear vision mirror. Hello, folks. Glad to see you. Run up to the store. I'll be there in a few minutes with the truck. Make yourself at home," and Tommy mounted the seat and pulled the truck to one side to allow Jimmy to pass.

Criticises Tommy's Appearance

"Say, J. G.," remarked the Pawtucket factory's sales manager, "did you notice Tommy's not as careful of his dress as he used to be. Rather a very ordinary suit, and he used to be such a dresser. And did you notice the 'folks' stuff and 'make yourself at home?' If that's what country life does for one, me for the big cities."

"Aw, grape nuts," said the Yearrich representative.

"What do you mean "

"Reason," was the reply. "Ask Tommy."

On arriving at 180 Main Street, this is what J. G. and Del noticed. At the left of the entrance to the salesroom and placed diagonally was a 1½-ton Providence truck, with big pneumatics and a farmer combination body. It bore a sign stating, "Sold to K. E. Witherspoon, Meadow Brook Farm." "That's the chap that Tommy sold a Pawtucket sedan to and gave me the order, Del. You remember it?" At the rear of the room and directly in back of the truck was a neat rack containing catalogues, circular matter and literature, and Del Hawkins with an eye to what the Providence factory issued noted that each compartment of the rack had a number, and commented on same. "Oh, that's old stuff, Del," said Cal Emmett. "The factory has been using that system for some time. When a salesman wants dope sent out he just gives the girl the number. Salesman has a list of dope with numbers. Quite easy. We have that beat at the Yearrich factory. You see it's like this—" But Cal was talking to empty air. Del was crossing to the other side of the salesroom, where J. G. was giving it the once over. There was a large table stacked with the local and county papers, farm, trade and popular magazines. Around the table were comfortable and deeply upholstered chairs and nearby was a divan. A rug was under foot and against the wall was a full length plate glass mirror. And seated in one of the chairs was a prim, middle-aged woman reading a farm paper. A young woman, evidently the daughter, seated nearby, was scanning a popular magazine. Heaped between the couple was a pile of parcels.

It May be Bunk, But!

At this moment Tommy Williams entered and making his way to the women greeted them with "Hello, folks. Glad to see you. Hope you have made yourself at home. How's Jim, Mrs. Brown? Si Wilkins tells me that Jim plans to start plowing next week. By the way, you're surely going to Miss Burton's shower. No? Why not, Oh, that's not a good excuse. I'll stop for you on my way; Mrs. Williams will be pleased to have you ride with us and there will be room for Mandy and Jim as well. And how are you, Mandy? By the way, Mrs. Williams wants to get your recipe for making apple dumplings. She's jealous ever since I came home and praised your dumplings. My! the chef at the Waldorf could take lessons from you and they pay him $50,000 a year."

"Listen to the bull," remarked Del. "Some little josher, Tommy, what?"

"Aw, grape nuts." This from the Yearrich man.

"Hum," said J. G. "It may be bull, but it goes over big." And apparently it did, for when Jim Brown drove up in his flivver for his folks, and Tommy carried the bundles out to the car, Del heard Mrs. Brown remark: "Now, Tommy, we shall expect you and the missus up Sunday to dinner." "And I'll have some of those dumplings," piped up the younger woman as the car shot away.

"Well," said Del, "we're here. And what about the grape nuts stuff, Tommy?"

"I don't get you."

"He wants to know all about this," broke in Cal Emmett, waving his hand toward the table, etc.

"I don't just know," interrupted J. G. "I want to know how you are putting over trucks. I see a few of them around and we just saw your man close a sale. Are you selling them?"

Instead of replying Tommy marched J. G. into his office. There upon the walls were rows of photographs illustrating Providence trucks sold local farmers. And Del Hawkins noticed that several were autographed. "What's the idea. Tommy? Why keep the pictures in here? Why not in the salesroom?"

Action *vs.* Posed Dealer Pictures

"Well," was the reply, "I always invite my prospects in here and the pictures have a psychological effect. The autographs are just a notion of mine to show a prospect that the photo is genuine. Take the pictures myself. Getting to be quite a photographer. And besides when I am out at the farm getting the truck I take a few others and make a present to the folks. Not very expensive and I charge it up to the sales account. Helps wonderfully. And you see I get some real action pictures, not poses like the professional takes for us dealers. Going to do the same on all trucks I sell."

"Not a bad idea," commented Del.

"Good plan," said J. G. "Puts the punch in them."

"Next best to movies," broke in the Yearrich man. "Now our company keeps a couple of movie men traveling around and—"

"Aw, grape nuts," interjected Del Hawins, whereas all laughed at Cal Emmett's discomfiture.

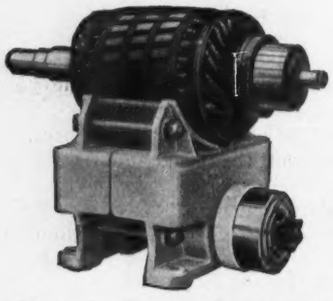
(Continued on page 100)

Service Station and Repair Shop Appliances

North East Armature Tester

To facilitate testing and repair work on electrical apparatus, the North East Electric Co., Rochester, N. Y., has developed a growler for testing armatures. This device will locate open and grounded circuits in the armature. It is a device that magnetizes the armature coil in such a way as to produce a strong secondary current in any coils or portion of coils that may happen to be short-circuited.

The growler, is durably and compactly made. It is easy to operate and is provided with a set of pole pieces to accommodate armatures below 2 in. diam. and it will care for any armature up to 4 in. diam.



New North East Armature Testing Unit

It operates on the usual transformer principle, requiring alternating or periodically interrupted current. It can be used on either 110-volt or 220-volt circuit without any change of connection. Furthermore, its capacity is such that it can be used with current of any frequency from 60-cycle (or higher) down to 25-cycle. This growler, ready to install with plug and cable, lists at $30.

The HB Ball Bearing Motor Grinder

One of the newest time and labor saving machines is the HB Ball Bearing Motor Grinder, manufactured by The Hobart Brothers Co., Troy, Ohio.

It is equipped with a 2 hp., quiet proof ball bearing electric motor and has ample power for the grinding of castings, sharpening of tools, tire buffing, and the thousand other uses around a garage or machine shop. Buffing wheel or wire brush wheel can be substituted for one of the grinder wheels.

The machine is strongly constructed throughout to stand up under the heaviest kind of continuous work. The sturdy base and ball bearings insure freedom from vibration. Bearings require lubrication only once in every three or four months. The outfit is very much more convenient than the belt-driven grinder. No belts to fly off or break. Weight 275 lb. Further detailed information may be had from the manufacturers, The Hobart Brothers Co., Troy, Ohio.

Brown Valve-Grinding Outfit

The Brown Co., 1071-73 Clinton St., Syracuse, N. Y., manufacturers of the Brown Valve Grinding Set, asserts that this tool grinds valves, easily and accurately. A valve lifter and grinding mixture, together with the grinder itself comprise the set. It is simply constructed, small of compass and light in weight, and can be readily packed by removing both handle and driver.

The arc motion of the handle imparts to the screw driver, by a pinion and rack, a semi-rotary motion. By checking a full revolution any chance of ribbing or scratching the contact faces is elliminated. No great pressure is required when using this device. The lifter raises the valve from its seat each time the pressure is taken off the valve top.

The lifter consists of a heavy brass spiral spring, equipped on the ends with a bearing and clamp fixture. To accommodate the varying stem diameters, the clamp is provided with two set screws, which when adjusted to the size desired, are left in that adjustment. The thumb screw is used for holding effect.

Three Units of the Brown Valve Set

To set the lifter, the valve must be removed and bearing end of lifter slid over valve push rod, resting on stuffing box.

The compound furnished with Brown set contains an abrasive held in suspension by a lubricant and is a standard cutting medium for polished surfaces. It is packed in a substantial box and sells for $3.50 complete.

March Vehicle Exports

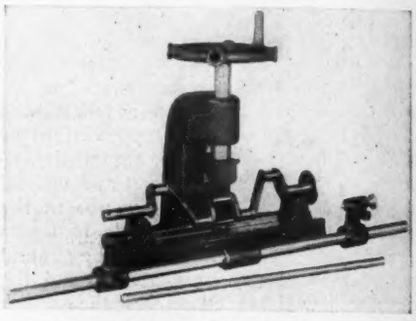
Experts of motor vehicles from the United States for March, totaled 2143 commercial cars, valued at $2,898,626, and 13,457 passenger cars, at $14,745,798.

Of commercial cars France received 30, valued at $116,218; Norway 50, $103,583; Sweden 69, $121,898; England 323, $504,837; Canada 15, $247,218; Mexico 77, $108,908; Cuba 77, $180,221; Brazil 218, $124,760; Peru 305, $198.845; British India 131, $233.883.

Straightening Presses

Carl Pletz & Sons, 717 Sycamore St., Cincinnati, Ohio, is producing two sizes of straightening presses, as essential additional equipment for garage and repair shop. The two models known as No. 1 and No. 2, vary in size and capacity. A press of this type will prove very valuable about the machine shop or garage particularly where shafts, arbors, reamers, boring bars, shafts of all kinds continually require straightening.

This tool has centers mounted on the front to test the part being straightened without trouble. The center heads are arranged to support a steady rod so that



Pletz Straightening Outfit With Crankshaft in Place

the operator can rest his hand along the piece being straightened. This rod can be set in notches to suit the diameter of the work. The adjustable center is arranged with spring tension, and a convenient knob permits of the easy handling of work in and out of the centers. Low blocks for straightening shafts are included in the equipment but higher blocks can be furnished as extra.

The screw is made of a good grade of steel and is fitted with a separate nut pressed into the housing against a heavy shoulder and held by a set screw. If the nut should become worn, it is easily and cheaply replaced.

The No. 1 press has a 1¾-in. screw four square threads to the inch, distance between centers 36 in., distance from center of screw to housing 3¼ in., maximum distance between blocks 19 in. and will straighten 2¼-in. material. The diameter of the hand wheel is 9 in. and it weighs about 275 lb.

No. 2 press has a 2-in. screw with four square threads to the inch. The distance between centers is 42 in. It will handle work up to 3 in. diam. and weighs approximately 325 lb.

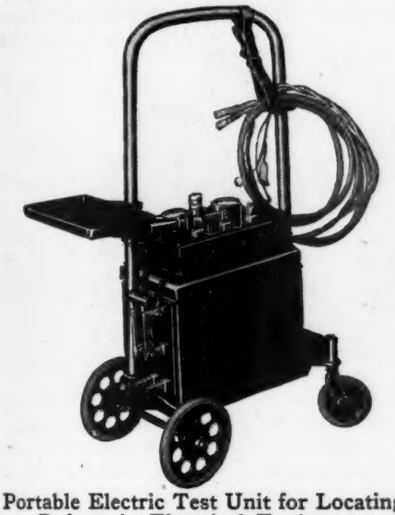
$125,000,000, and 3500 Miles of Roads for Pennsylvania

At the close of the state administration now in office, Pennsylvania will have expended, during the four-year period, $125,000,000 and will possess 3500 miles of primary highways. These roads will be the most direct routes, will parallel the railroads, and will be ready to carry railroad freight in emergencies.

Items of the Service Products' Garage Equipment

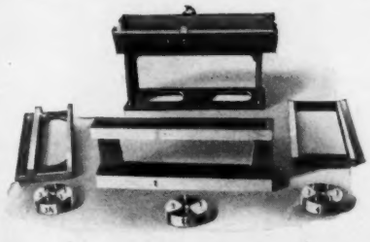
Several interesting items of equipment for use about the garage and service stations and battery repair stations are being manufactured by the Service Products Co., of Springfield, Ohio. Among these devices are the Portable Test Units, Running-in Machine with attachments, the Battery Post Builder and the stationary electric unit test instrument.

The Electric Portable Test Unit, known as Model TF-500 is made especially for detecting anything wrong in the electrical equipment. Various units such as motors, generators, ignition distributors, etc., can be tested without removing them from the car.



Portable Electric Test Unit for Locating Defects in Electrical Equipment

The outfit consists of a battery and precision meters assembled with the necessary leads. The battery is a double 6-volt battery with special double pole, double throw switch. A Weston ammeter, with double readings, 30-0-30 and 600-0-600, and a Weston voltmeter with registrations 0 to 15, a switch and a carrier for motor, generator and tools are included in the assembly. The entire unit is mounted on a rubber tired truck. Heavy leads are provided for the testing of starting motor, two light leads for generator and ignition tests and one light lead for recording voltage. The double 6-volt



Various Adaptors for the Running-in Machine

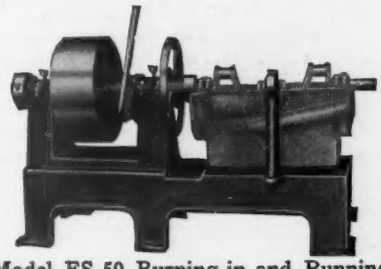
battery, is of sufficient capacity to enable the testing of both 6- and 12-volt systems.

The Battery Post Builder is stated to build the posts up square and eliminate any chance of tipping. With it the molds, with which the outfit is provided in various types, are firmly clamped in place and making for a perfect job. This item is known as Model TF-503.

The Burning, Running-in Machine is made in a belt-driven type, Model FS-50 and in a direct motor-driven type, Model FS-51. The Model FS-50 has a base

Service Products Battery Post Builder

line 74 in. long, a height from the floor to the top of the drive pulley of 34 in., a drive pulley of 20 in. diam. and 8 in. wide. It is recommended to be driven at a speed of 200 to 225 r.p.m. and requires from 10 to 15 hp. Its net weight including the adaptors is 1300 lb. This machine is adaptable to the Fordson tractor, Model T Ford engine. However, motors furnished with detachable heads are the only kind adaptable on this machine. The master driving disk fits the Fordson crankshaft and the bed of the unit is machined to take the Model T cylinder block, and is also provided with an additional raising block adaptor for burning-in. When it is desired to turn the crankshaft over, without throwing in the clutch, there is provided at the rear of the machine, a disk with several 1-in. holes into which can be placed a bar to pull the shaft over, the hand wheel not giving sufficient leverage to do this. The main shaft of this device is of high grade steel, 2¼ in. in diam. Nickel bronze bearings are used and surfaces liable to wear are hardened. Two bolts are used to clamp the cylinder block in position. Raising blocks and adaptors for various types of engines are supplied and are

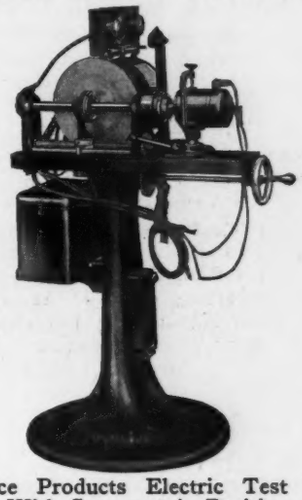


Model FS-50 Burning-in and Running-in Machine

accurately made so that there is no chance for misalignment.

The Model FS-51 motor-driven type has the gear mounted on the hub of the pulley and the motor is supported on the rear end and driven through the rawhide pinion to large gear. This machine is more desirable than the other model since line shaft and other machine tools can be driven from the large pulley.

The Model TF-1 Electric Test Unit is universal, being adaptable for testing all types of starting motors, generators, magnetos, ammeters, switches, etc. It consists of a ½-hp. motor, friction drive, flexible coupling, universal bracket, Weston ammeter, Weston voltmeter, tachometer and a double 6-volt battery. The latter item is mounted on the pedestal under the base and the former units, assembled on the base, are mounted on a metal pedestal. The function of this device is for testing starting, lighting and ignition equipment. It is motor-driven with a variable speed from 0 to 3000 in either rotation. It has a double 6-volt battery and a series multiple switch for testing 6- and 12-volt generators and motors. A universal clamp is provided for mounting the motors and generators and will accommodate those of from 4 to 7 in. diam. This unit is also adaptable for testing magnetos. A universal, flexible coupling and a chuck which takes shafts 5-16 to 1¼ in. and gears 1¼ to 3¼ in., provide driving connection for practically all units. Five leads are furnished for making all tests, two leads for the generator, a voltmeter lead and two heavy leads for starting motor tests. One of the features of this outfit is that a portion of the



Service Products Electric Test Unit With Generator in Position

flexible coupling is keyed to the revolving shaft and has 1½-in. pulley face and by means of a belt, power can be transmitted to other small tools, such as bench grinders, lathes, drills, etc. The height of this outfit is 55½ in., the floor space occupied is 36 in., and the shipping weight with battery is 695 lb.

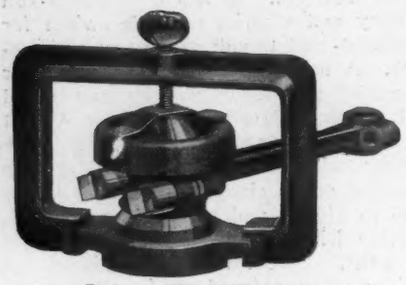
Bremer Babbitter

A device designed especially for babbitting the Ford rods is the product of the O. A. Bremer Co., 222 Division St., Burlington, Iowa. With this device, bear-

Showing the Bremer Babbitter and Bearings

ings are cast to exact size to fit the crankshaft without any scraping or fitting. The only finishing required is the removing by a rough file of sharp corners and fins. This device consists of a special formed metal mandrel. The metal is machined to the thousandth part of an inch, thereby

making it possible to cast bearings ready to fit the shaft for the usual "burning in" process. It sells at $15.



Bremer Ford Babbitter

Solid-Tire Forcing Press

Massive strength combined with non-complex operating mechanism makes the Southwark Hydraulic Tire Forcing Press, a product of the Southwark Foundry and Machine Co., Philadelphia, Pa., highly eligible as an effective truck tire mounting and demounting unit.

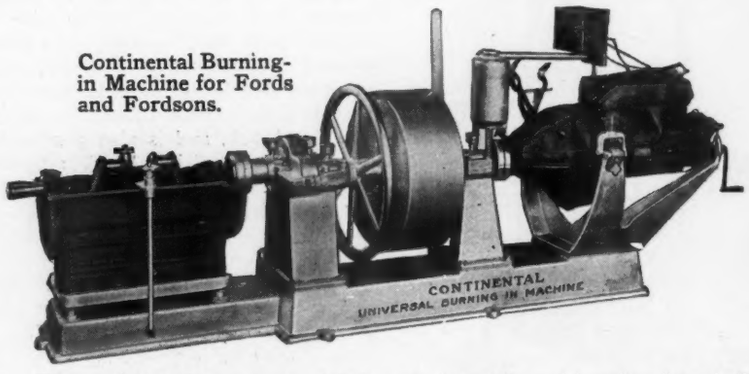
One of the features of this press is its improved pump bearing frame, which, as may be seen from the illustration, is firmly mounted on the right of the right vertical supporting channel. It is built to the undersides of the top channels, hence the strain from the connecting-rods is against the channels. This one-piece supporting frame and split babbitted journal boxes assure continuously perfect alignment.

The uprights of this press are steel L beams. The cylinder is an open-hearth annealed steel casting. The ram is made of close-grained iron, highly polished. The body of the pump is of solid steel forging with drilled and bronzed lined ports. The plungers are of tool steel, tempered and polished. The packing is readily replaced. Gravity feed is possible because of the sheet steel reservoir, which is located above the level of the pump. The space between the uprights is 44 in., and the platens, 36 in., the diameter of which is 42 in. The ram stroke is 30 in. Net weight of the press is 9200 lb.

Continental Burning-in Machine

The Continental Burning-in Machine, produced by the Continental Auto Parts Co., Columbus, Ind., is constructed so that a Ford engine can be tested at one end of the block while the bearings are being burned in, in another block, at the other end of the machine. On the burning-in end the universal fixture takes all removable head engines with a height varying between that of the Fordson block to that of the Ford Model T car. The adjustment in height is obtained by adjusting screws. The main shaft runs on nickel babbitt bearings. Steel gears are contained in an oil-proof housing flooded with oil. The test wheel for testing the bearings is 27 in. diam. and provides means for assuring the correctness of the work. The clutch is strong and simple and is of the balanced type. The flywheel is large.

The floor space required is 8 ft. 4 in. by 2 ft. 3 in., and the height 35 in. The 23-in. clutch consists of interchangeable driving plates and hardened steel driving pins. The speed of the flywheel averages 600 r.p.m. and the power required 20 to 25 hp. This machine can be obtained with special attachments for testing out the Ford Model T engine, under their own power, or can be had with simply the running-in feature.

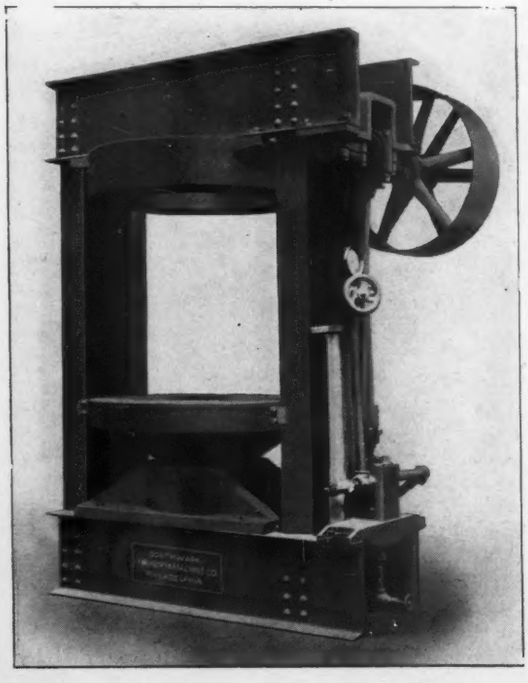


Continental Burning-in Machine for Fords and Fordsons.

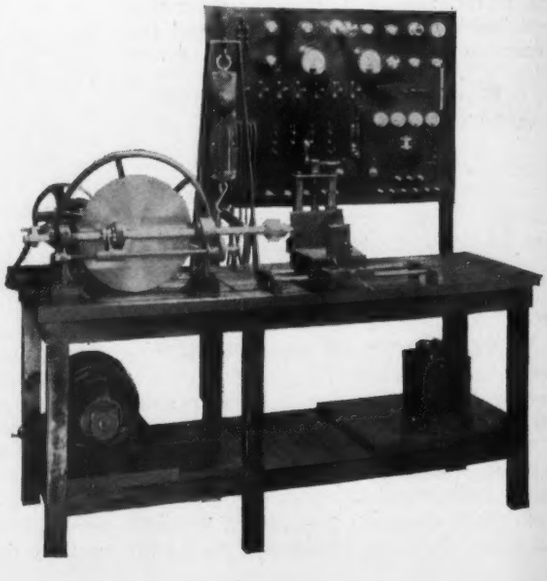
Ambu Electrical Test Bench

A new Universal Test Bench for electrical units in the automotive line, has been designed and brought out by the American Bureau of Engineering, Inc., 1601 S. Michigan Ave., Chicago, Ill. A practical test, it is stated, can be made of all types of starting, lighting and ignition apparatus. Starting motors, generators, magnetos, regulators, cutouts, distributors, etc., can be tested under actual operating conditions. Even heat and efficiency tests can be made and brushes "run in." Charging currents can also be measured at various generator speeds. The current, the starting motor requires when starting a cold engine and the maximum torque of the motor can be measured. Switches, fuses, lamps, etc., can be readily tested and armatures for grounds, open or short circuits, etc.

The equipment, in general, is composed of the bench proper with the panel and apparatus mounted thereupon. There is a three-way vise for retaining any generator, motor or magneto while it is being tested. The driving mechanism is so constructed that various speeds can be obtained and variations can be accomplished in either



Left: Showing the Simple Construction of the Southwark Heavy-Duty Press.

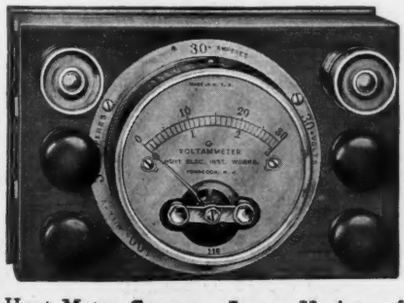


Right: Ambu Testing Bench for Electrical Equipment

direction from 100 to 4000 r.p.m. The pressure of the friction wheel and the variable speed driving mechanism can be varied to eliminate slipping under conditions of high speed or heavy loads.

New Hoyt Electrical Instruments

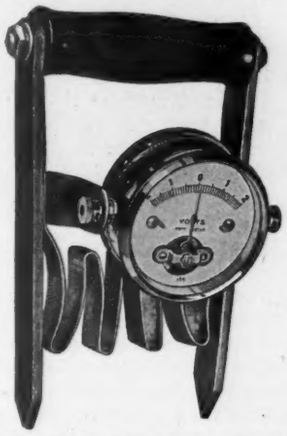
The many uses to which this meter may be utilized emphasize its usefulness to the garage or repair shop. It is an all purpose miniature portable measuring instrument 4½ x 3 x 2 in. It is used to determine the output of the generator; the rate at which the battery is discharging; the current consumption of each individual lamp; the entire lamp load; the condition of the wiring; the voltage of the storage battery; the voltage of each individual cell; the current required for the starting motor; it detects leaks, grounds, short circuits or open circuits in armatures, fields, or commutators, of engines or generators. It consists of a commutator, which is stationary, mounted in a receptacle having provision for a number of shunts and resistances, connections with which are made through the several segments of the commutator. A small milvoltmeter is centrally pivoted to the commutator in such a way that the meter terminal makes connection with successive segments of the commutator as the meter is rotated on its axis. A fixed index finger on the side of the knurled meter case shows the position of this terminal and suitable markers on the surface of the commutator receptacle, show the position of the segments. No current passes through the meter unless the index finger points to the marker corresponding with the binding post connected with the source of current, thus greatly lessening the danger of damaging the instrument by overloading it through a wrong connection. This invention practically re-



Hoyt Meter Covers a Large Variety of Tests

duces the problem of making a voltammeter with a number of scales to the simplicity of a low range single scale voltmeter, and should repairs be necessary, the probability of having to alter the adjustment of the extra shunts or resistances is very remote. In the Hoyt Rotary Meter there is but one winding in the moving system and one pair of conductors from the moving system to the contact terminals and these consist of two coil springs which serve the double purpose of carrying the current to the coil and furnishing the controlling force of the movable member. All other coils and shunts are contained in the commutator receptacle, each with its own circuit from the binding post to the corresponding segment of the commutator. This meter has six terminals giving the following ranges: 0-30 amperes—0-30 volts. 0-3 amperes—0-3 volts. 0-90 mil-volts.

This Hy Rate Cell Tester is an especially desirable addition to the equipment of a garage or repair shop, and its use is becoming very extensive. After making a test for the specific gravity it is advisable to learn which of the cells is not functioning properly. This is accomplished by the use of this instrument, shown herewith. A Cell Tester with voltmeter attached can be supplied—the instrument used being a high grade D'Arsonval type. Terminals are on the meter itself. It consists of two metal prods sharply pointed and spaced so that they may be placed across the cell terminals. A measured resistance of special metal is inserted as shown, and an insulated reinforced handle large enough for the operator's hands



Hoyt Hy-Rate Cell Tester Determines Accurate Condition of Battery Cells

separates the prods. Terminals are placed at the top so that the 3-volt scale of Rotary Meter or the Cadmium Meter may be attached. The resistance is such that a current of 100 amperes passing through shows a voltage drop of 1 volt. In using, care should be taken to press the points well into the terminal so that a good connection is made. If no reading is recorded on the voltmeter the cell is in bad condition, but the actual reading, even on a good cell, cannot be stated definitely, as it depends on the state of charge and the total ampere hour capacity for which the cell is designed. The particular value of the instrument is to be able to compare one cell with another, in the same battery—readings should be the same and should remain constant for a few seconds at least.

An accurate method of obtaining information regarding the condition of battery without opening the battery plates, is the Cadmium test, the merits of which is quickly recognized by garage and repair shop owners. The complete equipment consists of a Hoyt divided-scale voltmeter with range—0.3, 0 plus 2.7, and having two prods, one of steel and the other with a stick of chemically pure cadmium attached at right angles to the steel. The handles are large, but light, fitted with over three feet of rubber-covered wire, with suitable terminals at the other end. In other words, cadmium readings are valuable to denote plate conditions at a time when the cell is nearing total discharge and maximum charge—variation from the figures given in the table, which are average for a great many observations, would indicate trouble. In making the tests, a divided scale voltmeter (Type 515D) is used with a reading 0.3 to the left of zero and 2.7 to the right, and two

Cadmium Test Instruments for Battery Plates

prods, one of steel and the other with a stick of chemically pure cadmium, a neutral metal attached. A normal charging current must be flowing through the battery and then connections are made. The introduction of the cadmium into the electrolyte really makes of the cell two distinct cells. For instance, the steel prod is on the positive cell terminal and the cadmium, attached to the negative terminal of the voltmeter, is really making the negative plate—with these connections the voltage of the positive plates is being measured. When the steel prod is on the negative cell terminal the voltage of the negative plates is being measured. The stick of cadmium is either immersed in a solution of sulphuric acid of specific gravity 1.250, or placed in such a solution for five minutes before being used. Cadmium sulphate forms on the stick. These devices are manufactured by the Hoyt Electrical Instrument Works, Penacook, N. H., The Burton-Rogers Co., of 755 Boylston St., Boston, Mass., Sales Department.

Healy Valve Reseating Tool

A reseating tool that will replace the valve, remove the shoulder and form a new seat quickly and easily, is the product of the Healy Tool & Appliance Co., 62-64 Pearl St., New York.

The dresser head of this device has an inside chuck with double ended bearing. It is closed on the valve stem permitting the valve to turn without chattering by a fine adjustment.

A very fine cut can be taken on the valve head by setting the 45 and 60 deg. cutters by a micrometer screw. The seating cutters have a patented feature permitting the cutter, which is ¼ in. longer than the valve, to enter the port. This large size cutter is utilized in taking off the shoulder. The port centering device is tapered and fits any port. This device retains the cutter carrier centered in the port above while the pilot keeps it centered perfectly below, thereby permitting the reaming of a clean seat.

The No. 6 Healy Valve Reseater for all trucks and cars sells for $35. The same without dresser head sells for $18.

Grinders and Drills, Portable and Stationary

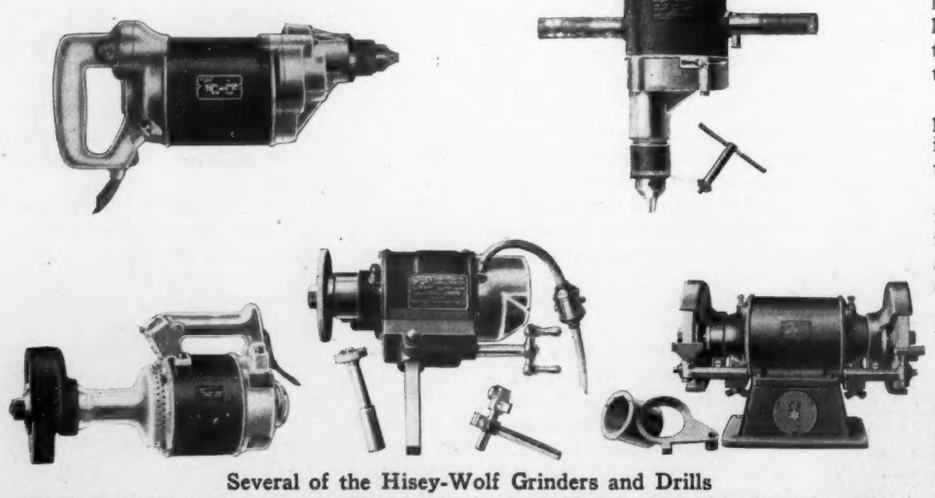
Many models of hand and breast drills, stationary grinding machines, portable electric surface grinders, electrical tool post grinders, etc., help to constitute the line of the Hisey-Wolf Machine Co., Cincinnati, Ohio. Many new features are incorporated in these products. For instance the bronze bearing on the wheel end of the motor is unusually large and cone-shaped to such an extent that it can be easily adjusted in either direction, and loosened or tightened without danger of freezing the bearing. The adjustment is made from the outside of the motor, without removing a single part, not even the grinding wheel. The bearing on the commutator end of the motor is a combination thrust and annular, self-adjusting ball-bearing. They are completely inclosed, affording protection against foreign matter, and have liberal lubricating reservoirs, attached to which are self-closing oil-cups.

Simplicity in construction and operation is another effective phase of these electric tools. The tool-post-grinder can have its direction of rotation reversed immediately by changing the two lead wires from one spring-snap binding-post to the other. The tool-post-bar is of special design, allowing the motor to be swung to any angle within a complete angle. Wheel guards are provided.

The motors are designed by its engineers for tool work and are manufactured in its own shops.

The portable electric surface grinders are adaptable for machine shops, factories, etc. They can be used with special wheels for buffing and polishing and the wire brush wheels for cleaning castings. When not in use as a portable machine, the grinder can be placed in a suitable frame for sharpening tools. S K F ball bearings are used throughout.

The Hisey ball-bearing hand and breast drills operate from any incandescent lamp socket. They are made in several styles and range in size from 3/16 to ¾-in. capacity. These tools are for drilling steel, iron, wood, marble, slate, etc., and rated capacities are given for drilling in steel. Ball thrust bearings on the chuck spindle are provided to take the end- thrust. The switches on all these tools are patented and conveniently located in either the side or top of the handle, according to style of the machine. The gears are made of quality steel, accurately machined and hardened to secure toughness and long life and are completely incased. These drills can be had as two-speed machines also.

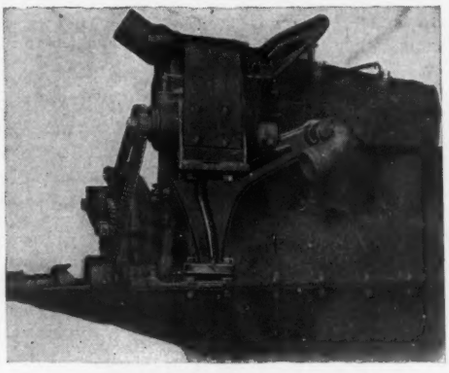


Several of the Hisey-Wolf Grinders and Drills

The upper left illustration shows the Hisey ball-bearing hand drill; the upper right illustration shows the ball-bearing hand and breast drill; the lower left illustration shows one of the portable grinders; the lower center illustration is one of the tool-post grinders with horizontal slide adjustment; the lower illustration shows the Hisey bench grinder.

Outfit for Installing Magneto on the Ford Power Plant

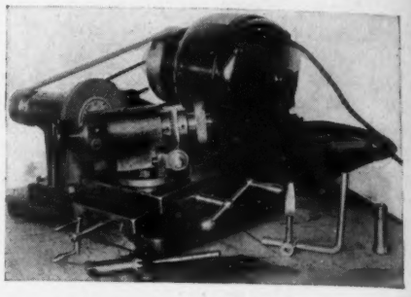
A simply made and easily attached outfit for the mounting of a magneto on the Ford Power plant is being offered to the trade by the Magneto Attachment Co., Inc., 4077 Park Ave., New York City. The machined brackets are of cast iron. The silent link-belt chains are carried by 3½ per cent nickel steel machined sprockets, one machined to fit on the camshaft and one on the magneto shaft. The drive is from the camshaft. The list price is $18.50 each, complete with switch, key, wires, bolts, etc.



Magneto Mounting for Ford Engine

Franklin Portable Machine Shop Unit

The Franklin portable machine shop unit, for the conventional repair shop or service station requires little space; can be shifted anywhere, and any electrical lamp socket with proper current will satisfactorily provide it with motive power. This device is a product of the Franklin Tool & Machine Co., Springfield, Mass.



Franklin Flexible Drilling Attachment Permits of Work in Inaccessible Places

The complete equipment consists of a substantial base upon which is mounted a motor which drives an emery wheel at engine speed and a valve holder at reduced speed; an emery wheel; a diamond tool for truing and dressing the emery wheel; a spring chuck or collet of a size to accommodate any definite diameter valve-stem; a cutter of special type, interchangeable with other sizes on a shank or spindle, one end of which corresponds to the stem of valve and a gauge for accurately grinding the cutter.

A valve is shown in position for grinding in the accompanying illustration and the process is obvious. The smooth, mirror-like finish of the repair is a perfect angle in relation to the stem of valve which is the guiding part of the valve operation.

The cutter on the spindle is ground and sharpened in the same position as the valve is ground, which is necessary to bring the seats to the same angle and finish.

With the cutter in position, the end of the spindle, corresponding to the stem of the valve, is held in the same chuck as held the valve-stem and the gage establishes the correct position of each tooth of the cutter as it is carried across the wheel, the result being a perfect cutting edge.

An extra attachment, which is especially effective on large diameter seats, is employed for driving the reseating cutter where power is desired.

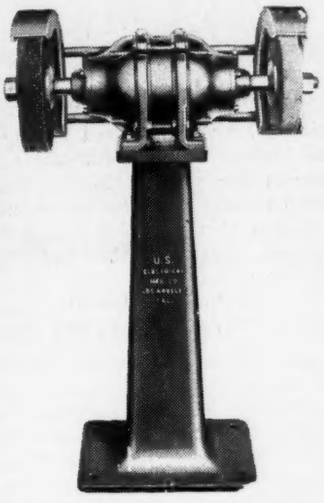
A drilling attachment on the same flexible shaft, which is very convenient for the smaller repair shops is furnished as extra equipment. It will take care of drills of from 3/16- to ⅜-in. diam.

Provision is made in the Franklin unit for taking up wear.

When the railroads were unable to make any shipments of cars Howard Zahn, Jacksonville, Ill., fell back on the Illinois river, chartered a steamer, moved thirty Chevrolet cars from St. Louis to Meredosia, and the remaining twenty miles to Jacksonville were covered by land.

Johnson Electric Buffer

The Johnson Electric Buffer produced by the United States Electrical Mfg. Co., Central Ave. and Third St., Los Angeles, Calif., is an outfit arranged for tire vulcanizing work.



The Johnson Buffer is Designed Especially for Tire Vulcanizing Work

The motors used in the Johnson line are especially designed for this work. They are enclosed and have exposed lamination to facilitate heat radiation. Rotors are of the squirrel-cage type. The ball bearings used are of standard size and readily replacable. Reservoirs are provided for lubrication. Protection against possible injury to operators is afforded by wheel guards . All pedestals are extra large and heavy, making for rigidity.

The Counter Unit for Testing Various Electrical Devices

The Gesny Electric Unit Tester, manufactured by G. E. Smith, 157 W. 78th St., New York City, has been designed to meet the needs of both the garageman and the accessory supply house as a convincing electric counter salesman. With it, such electrical accessories, as coils, spark plugs, horns, buzzers, volt and ammeters, dry cells, fuses and lamps of all bases, can be tested before the customer's eyes. It is small and portable and sells at $40.

The Gesny Tester is well made and attractive in appearance. The metal parts are heavily nickel-plated, the box itself is of polished quarter-sawed oak. All metal fittings are machine-turned brass, nickel-plated. An extra length of double flex electric wire, with detachable test clips arranged so that instant application can be made to the part or parts to be tested with two test prods, is supplied with the equipment. The current is produced by four dry cells of 1½ volt each, giving a total of 6 volts, 15 amp.

A small lamp bulb, secured on the left end of this outfit, assists in locating trouble. In case the machanic is called on to make repairs at night on the road, or for testing in the garage, trouble can be located by clipping the length of the twin flex cord, also provided at the left end, to the coil rack.

There is a place for coils to be tested, as shown in the accompanying illustration. The coil is inserted in the slide, which is intended to give an accurate test of the Ford type coil. After the coil is inserted, a button is depressed and current passes through the coil. The vibrator can then be adjusted. Spark plugs can also be tested on either of the two uprights, next to the coil testing unit. Next, is the volt and ammeter, which is connected with the binding posts, for accurately testing the battery, either in the car or in the tester box itself. To the right of the volt and ammeter is the fuse test rack connected with a pilot lamp combination. Practically any size fuse can be tested, the lamp lighting if the fuse is correct. This rack is so designed that test clips can be attached, for searching defects in the wiring system of a car by using the test prods to locate open circuits or shorts.

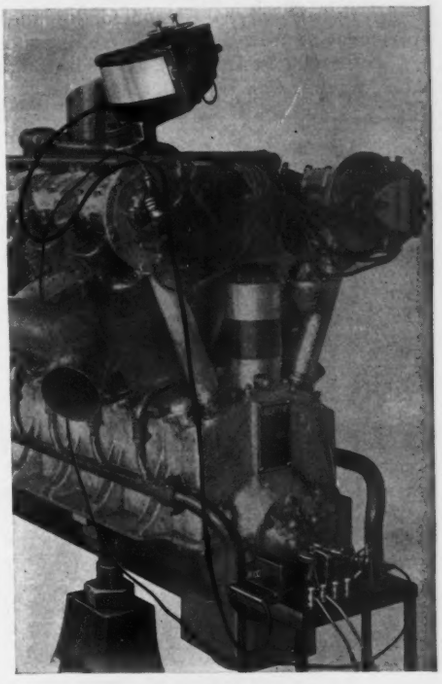
Lamp bulbs are tested with the two uprights on the right top of this device. The curved standard is designed to test bulbs of single base and the two straight uprights, to test bulbs of double base. The device to the right of the fuse test is the battery polarity indicator, where a quick check up on the reading of the positive or negative poles of the battery under test can be made, or the battery can be correctly installed. The two large binding posts, shown at the right end of the instrument, have adjustable clips for use in testing bells, horns, buzzers, supplying power to the trouble light and other uses where source of current is required and especially useful if the mechanic is called on the road to make repairs. Electrical trouble right on the road, can be tested with this device and readily checked up. The car, moreover, can be operated on the batteries in this unit sufficiently to get the car to the garage.

The Gesny Electric Tester is Designed for Testing Various Electrical Units.

Midgley Gas Engine Indicator

The Midgley Indicator, manufactured by the Dayton-Wright Division of the General Motors Corp., Dayton, Ohio, is an instrument designed for use by engineers and dynamometer equipment.

By its use the following new and useful data may be obtained: Compression value of various fuels in a given engine; critical compressions of motor design; character of combustion; ignition characteristics. At the same time it makes available the following data: Mean effective pressure; indicated horsepower; indicated efficiencies; valve setting; compression valves; type of expansion; (after burn) back pressures. It may easily be adapted for studying manifold problems as follows: Distribution; fluctuations at various throttle openings; ramming; loading; muffler effects. It is especially useful for studying motor operation and fuel combustion. It is not easily broken or put out of adjustment, and requires no expert to get satisfactory results.



Midgley Indicator Mounted on a Liberty Engine

All manner of new and valuable data can be obtained by the use of this instrument

The construction of this instrument permits it to be used to indicate either pressure volume or pressure time relations; it is almost free from the effects of inertia, even at high speeds; and it gives optical cards which are visible at all times. These cards are easily put into permanent form by the use of paper sensitizde to light, so that neither plates nor films are required.

The continuous graphical indication of conditions within an engine, makes possible easy and accurate motor adjustment and fuel adaptation.

The instrument is composed of two separate units, one of which is connected to either the engine or the dynamometer shaft, and the other to the combustion chamber of one of the cylinders of the engine. The interconnection between the two units is electrical for taking pressure time cards and mechanical for taking pressure volume cards. These two units may be considered as composed of five elemental systems working in unison to produce the desired results. These systems are: the pressure element; the optical system; the photographic system; the pressure time synchronizer; the pressure volume synchronizer.

Economy Battery-Charging Clip

A battery charging clip made of special acid-resisting wire, lead coated, intended for storage battery charging, is the product of Charles F. Hartung, Higgins Bldg., Los Angeles, Cal.

Battery Clip for Battery Service Station

The jaws and legs are of hard cast lead, and being made of lead, they are acid-proof and cannot sulphate. The teeth construction insures positive contact. The jaws of the clip have a spread sufficient to grip the largest battery terminals with ease and yet not affect the tension of the spring wire. Flexible covered wire or cord is used, although plain rubber-covered, primary ignition cable is preferable. The clips are equipped with lengths to suit. The insulation is sufficiently removed from each end of the wire and is wrapped and soldered around the wire part of the clip. This connection is wrapped with friction tape and shellaced as protection against acid. Capacity 50 amperes.

Cylinder Regrinding Service on Extensive Scale

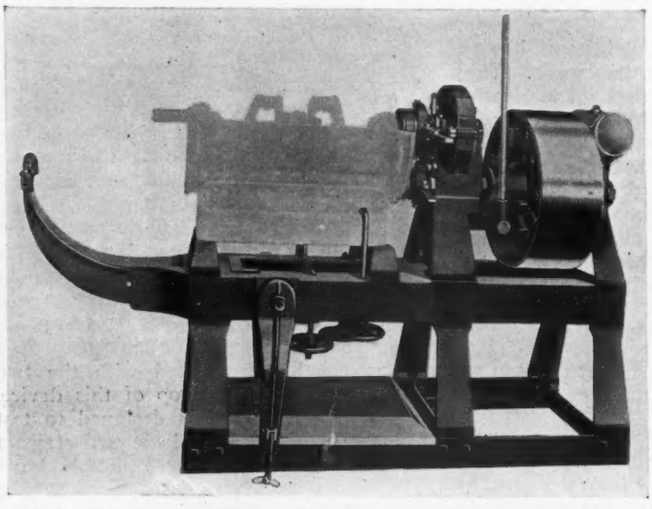
The Modern Electric & Machine Company of Indianapolis announces that it has one of the largest cylinder regrinding plants in the country, and perhaps the largest and most completely equipped in the Middle West. The regrinding plant has been largely equipped with the precision machinery used by the United States Government in the manufacture of the Liberty motor. This, together with the staff of experts which man the plant and the completeness of the service being rendered, has caused the volume of business of this particular department to grow rapidly. This concern also specializes in oversize heat-treated pistons, made according to their own special formula. These pistons are carried in stock in quantities for practically any model and make of automotive power plant in use.

This firm has to a large degree already perfected a system of production that permits them to give quick service on regrinding work. Realizing that every regrind job received represents a truck or car out of commission and badly needed, every possible effort is exerted to make shipment within a maximum of 72 hours after it has been received. Many jobs are shipped within 48 hours.

Nazett Model F Burning-in Machine

A newly introduced product of the Nazett Co., is a machine that facilitates a rapid and accurate "burning-in" and "work-out" of engine bearings on a Ford or Fordson. It is known as the Nazett and is handled exclusively by the factory representative of the Nazett Co., the Bailey-Drake Co., Inc., 1118 S. Michigan Ave., Chicago, Ill.

One of the features of this machine, is the fact that the entire job can be handled from start to finish right on the same block. This machine takes up little floor space, permitting its convenient placement into the smallest repair shop and also contains no complicated parts, being very simple in construction and easy to operate. It is claimed that the average mechanic can accurately set all main or connecting rod bearings in a very short time. The two main operations involved in this repair, follow each other in close sequence. After the burning-in operation is completed two side arms are raised and the machine is prepared for working-out duty.



Left Side of the Nazett Combination Burning-in Machine With a Phantom Ford Engine in Place

This product greatly resembles the model E of the Nazett line. The model F machine is a two speed outfit with cut steel gears, operating in oil. Price $350.

A decision of statewide interest has been handed down in the Connecticut supreme court which sets forth that the town of Norfolk is not at fault for a bad piece of road. Suit had been brought against the town. The court held that the town could not be sued but that action could have been taken against the highway commissioner.

Lownsberry Extension Handle

An extension handle that can be used in connection with single, double headed and "S" wrenches, and flat-headed tools is the product of the Gardner Specialty Co., Scranton, Pa.

Lownsberry Combination Wrench

This tool gives increased leverage and can be hooked on parts for manipulation in inaccessible places. Model No. 1 is designed to take wrenches up to one-half inch and is also provided with a screwdriver end, sells unfinished for $.75 and nickel-plated, $.90.

A New Tire Changing Device

A new tool known as the Duplex rim device, manufactured by the Duplex Company, Chicago, Ill., and distributed by the Fairbanks Company, New York City, is simple in design, easily operated and has no lamps or sliding arms to adjust. One of its most important features is the rolling support of the desk at the bottom which makes it impossible for the device to sag while expanding. The cause of this and the further action of the lever all side strain is eliminated, delivering a straight pull and push.

Being universal in its use, the device fits any size and make of straight, side or clincher, operating all in the same way. It will unlock and lock any make of rim and do all its work without injury to tire and rim.

In most cases when a tire is ready to be changed it is rusted onto the rim, and in pulling on one side only the strain will bend the rim out of shape, making it hard or impossible to lock. This trouble is also claimed to be eliminated by the use of this device.

The Duplex rim device is made in two sizes: No. 2, the garage size, has a 25-in. handle and sells for $7.00 and $7.50 west of the Rockies; No. 1, the size will fold compactly and requires little space in the tool box. Price $6.00, west of the Rockies $6.50.

Gearless Car to be Made

ALLIANCE, OHIO, May 15.—A thirty-six-acre tract has been bought by Pittsburgh capital at Garfield, six miles from here, and a factory will be built for manufacturing gearless automobiles. Duncan McDonald, the inventor, announces that his invention works to perfection, five machines having been tested. Unlimited capital is behind the invention.

Replacement Table. Corrected Monthly

Including Piston Ring Sizes, Carburetor Sizes, Brake Lining Sizes and Truck Frame Dimensions

Note: Under Carburetor Inlet Diameter will be found either the size of the main air intake or the gasoline fuel line

Name, Model, Tonnage and Year	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Acason R–1—1918	4	1/4	1	.....	11 1/2	3	1/4	2	11 1/2	3	1/4	2	112	34
Acason RB–1 1/2—1918	4	1/4	1	.....	11 1/2	3 1/2	1/4	2	11 1/2	3 1/2	1/4	2	112	34
Acason H–2 1/2—1915	3	1/4	1 1/4	.....	13 1/2	3 1/2	1/4	2	13 1/2	3 1/2	1/4	2	130	35
Acason L–3 1/2—1915	3	1/4	1 1/4	.....	16	3 3/4	1/4	2	16	3 3/4	1/4	2	137	35
Acason M–5—1915	3	1/4	1 1/4	.....	18	4 1/2	1/4	2	18	4 1/2	1/4	2	167 1/2	35
Ace, Series A1 1/2—1920	3	1/4	1 1/4	1 1/16	12	3 1/4	1/4	4	12	3 1/4	1/4	4	122 1/2	32
Ace, Series A2 1/2—1919–20	3	1/4	1 1/4	1 1/16	13 1/2	3 1/4	1/4	4	13 1/2	3 1/4	1/4	4	144 1/2	32
Acme B–1—1916–20	3	1/4	1 1/4	.....	12	3 1/4	1/4	4	12	3 1/4	1/4	4	110 3/8	34
Acme F–1 1/2—1919–20	3	1/4	1 1/4	.....	12	3 1/4	1/4	4	12	3 1/4	1/4	4	124 3/8	34
Acme A–2—1916–20	3	1/4	1 1/4	.....	14	3 1/2	1/4	4	14	3 1/2	1/4	4	135 1/2	34
Acme C–3 1/2—1917–20	3	1/4	1 1/4	.....	16	3 3/4	1/4	4	16	3 3/4	1/4	4	150 1/2	36
Acme E–5—1919–20	3	1/4	1 1/4	.....	18	4	1/4	4	18	4	1/4	4	160	37
All-American A–1	3	1/4	1 1/8	2	45	2 1/2	1/4	2	43 1/8	2 1/4	1/4	2	104	31
All-American–1 1/2	.....	.....	1 1/8	2	45	2 1/2	1/4	2	43 1/8	2 1/4	1/4	2	116 7/8	34
All-American–2 1/2	.....	.....	1 1/8	2	.....	.....	.....	.....	.....	.....	.....	.....	Opt	34
Apex C–1	3	1/4	1	1	42	2	.....	2	41 1/2	2	.....	2	102	35 1/2
Apex D–1 1/2	3	1/4	1	1	42	2	.....	2	41 1/2	2	.....	2	102	35 1/2
Apex E–2 1/2	3	1/4	1	1 1/4	54	2 1/4	.....	2	53 1/4	2	.....	2	128	31 1/2
Armleder KW 3 1/2—1916–20	4	1/4	1 1/4	1/4	42	3	1/4	1	16	3 3/4	1/4	8	150	36
Armleder HW 2 1/2—1916–20	4	1/4	1 1/4	1/4	13 1/4	3 1/2	1/4	4	13 1/4	3 1/2	1/4	4	140	30
Atterbury 20R–1 1/2—1920	3	1/4	1	1/4	11 1/8	3 1/4	1/4	4	11 1/8	3 1/4	1/4	4	122 1/8	34
Atterbury 7CX–2 1/2—1919–20	3	1/4	1 1/4	1/4	13 1/8	3 1/2	1/4	4	13 1/8	3 1/2	1/4	4	133 3/8	34
Atterbury 7D–3 1/2—1917–20	3	1/4	1 1/4	1/4	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	145 5/8	37 1/2
Atterbury 8E–5—1919–20	3	1/4	1 1/2	5/8	17 11/16	4	1/4	4	17 11/16	4	1/4	4	157 1/8	37 1/2
Autocar XXI-F–2	4	1/4	1 1/16	.....	16 1/4	2 1/2	1/4	4	13	2 1/2	1/4	4	91	34
Available H–1 1/2—1920	4	1/4	2 1/4	1 1/8	48	2 1/2	1/4	2	36	2 1/2	1/4	2	120	32
Available H2 1/2—1916–20	3	1/4	2 1/4	1 1/8	13 1/2	3 1/2	1/4	4	13 1/4	3 1/2	1/4	4	144	32
Available H3—1916–20	3	1/4	2 1/2	1 1/16	16	3 3/4	1/4	4	16	3 3/4	1/4	4	168	36
Available H5—1916–20	3	1/4	2 1/2	1 1/16	18	4	1/4	4	18	4	1/4	4	168	38
Available H7—1919–20	3	1/4	2 1/2	1 1/16	72	3 1/2	1/4	2	72	3 1/2	1/4	2	168	38
Beck-Hawkeye A–1—1912–20	.....	.....	1 1/2	1 1/4	24	2	1/4	1	24	2	1/4	1	114	54
Beck-Hawkeye B–1 1/2—1912–20	.....	.....	1 1/2	1 1/4	24	2	1/4	1	24	2	1/4	1	114	66
Beck-Hawkeye C–2—1912–20	.....	.....	1 1/2	1 1/2	25	2 1/4	1/4	1	25	2 1/4	1/4	1	114	66
Beck-Hawkeye D–3—1920	3	1/4	1 3/4	1 1/2	25	2 1/4	1/4	1	25	2 1/4	1/4	1	136	72
Bell E–1 1/2	.....	.....	1	1/4	39	2	1/4	1	45	3	1/4	1	114	35
Bell O–2 1/2	.....	.....	1 1/4	1/4	48	2	1/4	1	51	3	1/4	1	126	35
Belmont A–1	.....	.....	1	1 1/2	32	2	1/4	2	31	1 1/2	1/4	2	78	34
Belmont B–1 1/2	.....	.....	1	1 1/2	41	2	1/4	2	40	1 1/2	1/4	2	120	36
Belmont C–2	.....	.....	1	1 3/4	41	2 1/2	1/4	2	40	2	1/4	2	124	36
Bessemer G–1—1917–20	3	.....	1	1/4	47 1/2	2 1/2	1/4	2	45 1/2	2 1/4	1/4	2	98	34
Bessemer H2–1 1/2—1917–20	3	.....	1	1/4	56 1/2	2 1/2	1/4	2	55	2 1/4	1/4	2	116	34
Bessemer J2–2 1/2—1919–20	3	.....	1 1/4	1/4	56 1/2	2 1/2	1/4	2	55	2 1/4	1/4	2	141	34
Bessemer K2–4—1919–20	3	.....	1 1/4	1/4	58 1/2	3 1/2	1/4	2	30 1/4	4 1/2	1/4	1	157 1/2	38
Bethlehem K–3/4—1920	3	1/4	1	1/4	49	2	1/4	1	21	2	1/4	2	90	32 1/2
Bethlehem G–1 1/2—1920	3	1/4	1 1/4	1/4	43	2 1/2	1/4	1	40 1/8	1 1/4	1/4	2	120	34 1/2
Bethlehem H–2 1/2—1920	3	1/4	1 1/4	1/4	51	3	1/4	1	49	2	1/4	2	132	34 1/2
Bethlehem F–3 1/2—1920	3	1/4	1 1/4	1/4	55	3	1/4	1	50	2	1/4	2	156	34
Brinton F–2 1/2—1914–20	3	1/4	1 1/16	1 1/4	13	3 1/2	1/4	8	13	3 1/2	1/4	8	135 1/2	33
Brockway S2–1 1/2—1919–20	3	1/4	1	.....	20	2	1/4	4	20	2	1/4	4	118	32
Brockway K4–2 1/2—1919–20	3	1/4	1 1/4	.....	12	3 1/2	1/4	4	12	3 1/2	1/4	4	142	34
Brockway R2–3 1/2—1919–20	3	1/4	1 1/4	.....	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	176	36
Brockway T–5—1919–20	3	1/4	1 1/2	.....	18	4	1/4	4	18	4	1/4	4	176	36
Chicago C1 1/2—1919–20	4	.....	1	1 1/2	12 1/8	3 1/4	1/4	4	12 1/8	3 1/4	1/4	4	125	32
Chicago C2 1/2—1919–20	4	.....	1 1/4	1 3/4	13 3/4	3 1/2	1/4	4	13 3/4	3 1/2	1/4	4	135	32
Chicago C3 1/2—1919–20	4	.....	1 1/4	1 3/4	16	3 3/4	1/4	4	16	3 3/4	1/4	4	180	36 3/4
Chicago D5—1920	4	.....	1 1/4	1 3/4	18	4	1/4	4	18	4	1/4	4	180	36 3/4
Clydesdale 120B–5	3	1/4	1 1/16	1/4	18	4	1/4	4	18	4	1/4	4	207	38

Name, Model, Tonnage and Year	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Clydesdale 90–3 1/2	3	1/4	1 1/8	1/4	16	3 3/4	1/4	4	16	3 3/4	1/4	4	166 1/2	38
Clydesdale 65X–2 1/2	3	1/4	1 1/16	1/4	13 1/4	3 1/2	1/4	4	13 1/4	3 1/2	1/4	4	137	33 1/4
Clydesdale 42–1 1/2	3	1/4	1 1/8	1/4	12	3 1/4	1/4	4	12	3 1/4	1/4	4	117 1/2	34
Clydesdale 32X1	3	1/4	1 1/8	1/4	20	1 3/4	1/4	4	20	1 3/4	1/4	4	117 1/2	34
Collier 18–1—1919–20	.....	.....	1	1/4	15	2 1/4	1/4	4	15	1 1/2	1/4	4	106	35 1/4
Collier 19–1 1/2—1919–20	.....	.....	1	1/4	19 1/2	2 1/4	1/4	4	19 1/2	1 1/2	1/4	4	120	32
Collier 20–2	.....	.....	1 1/4	1/4	19 1/2	2 1/4	1/4	4	19 1/2	1 1/2	1/4	4	132	32
Columbia G–2 1/2—1920	3	1/4	1 1/4	.....	55	3	1/4	2	50	2	1/4	2	132	32 1/2
Columbia F–1—1919–20	3	1/4	1	.....	39 1/4	2 1/2	1/4	2	40 1/2	1 3/4	1/4	2	108	32 1/2
Comet–1 1/2	4	1/4	1	1	17 1/4	2 1/4	1/4	2	17 1/4	1 1/2	1/4	2	100	36
Commerce E 1, 1 1/2	3	1/4	1	1/4	45	2 1/2	1/4	2	43	2 1/4	1/4	2	92 5/8	34
Commerce EP 1 1/2, 2	3	1/4	1	1/4	45	2 1/2	1/4	2	43	2 1/4	1/4	2	99 5/8	34
Concord A–1 1/2—1920	3	1/4	1 1/4	1/4	12	3 1/4	1/4	4	12	3 1/4	1/4	4	110 1/4	32 1/2
Concord B–2 1/2—1920	3	1/4	1 1/4	1/4	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	124 5/8	32 1/2
Conestoga 12	3	1/4	1	1/4	39	2	1/4	1	39	2	1/4	1	86	34
Conestoga 20–1	3	1/4	1	1/4	22	2 1/2	1/4	2	14	2 1/2	1/4	2	96	32
Conestoga 30–2	3	1/4	1	1/4	22	2 1/2	1/4	2	14	2 1/2	1/4	2	120	32
Corbitt E–1—1917–20	3	1/4	1	1/4	19	2	1/4	2	19	2	1/4	2	105	34
Corbitt D–1 1/2—1916–20	3	1/4	1 1/4	1/4	45 1/4	2	1/4	1	35 1/4	2	1/4	1	120	34
Corbitt C–2—1915–20	3	1/4	1 1/4	1/4	51 1/2	2 1/4	1/4	1	51 1/2	2 1/4	1/4	1	138	35
Corbitt B–2 1/2—1916–20	3	1/4	1 1/4	1/4	51 1/2	2 1/4	1/4	1	51 1/2	2 1/4	1/4	1	138	35
Corbitt AA–5—1919–20	3	1/4	1 1/2	1/4	69 1/4	3	1/4	1	69 1/4	3	1/4	1	160	38
Corbitt A–3 1/2—1917–20	3	1/4	1 1/4	1/4	64	2 1/2	1/4	1	64	2 1/2	1/4	1	160	35
Couple Gear HC–3 1/2—1906–20	.....	.....	2	1 1/4	48	3	1/4	2	.....	.....	.....	.....	168	42
Couple Gear AC–5—1908–20	.....	.....	2	1 1/4	48	3	1/4	.....	.....	.....	.....	.....	168	42
Couple Gear LD–6—1917–20	.....	.....	2	1 1/4	48	3	1/4	.....	.....	.....	.....	.....	168	42
Dart H–1—1920	3	1/4	1 1/4	1 1/16	19	1 3/4	1/4	4	19	1 3/4	1/4	4	102	34
Dart S–1 1/2—1920	3	1/4	1 1/4	1 1/16	19	1 3/4	1/4	4	19	1 3/4	1/4	4	112	34
Dart M–2 1/2—1920	3	1/4	1 1/4	1 1/16	10	2 1/2	1/4	2	19	3 1/2	1/4	4	124	34
Dart W–3 1/2—1920	3	1/4	1 1/4	1 1/16	28	2 3/4	1/4	4	28	2 3/4	1/4	4	144	38
Day-Elder A–1	3	1/4	1 1/4	1/4	19	2	1/4	4	19	2	1/4	4	103	35
Day-Elder B–1 1/2	3	1/4	1 1/4	1/4	19	2	1/4	4	19	2	1/4	4	119 3/4	35
Day-Elder D–2	3	1/4	1 1/4	1/4	45	2	1/4	2	45	2	1/4	2	125	35
Day-Elder C–2 1/2	3	1/4	1 1/4	1/4	52	2 1/4	1/4	2	52	2 1/4	1/4	2	125 3/4	35
Day-Elder F–3 1/2	3	1/4	1 1/2	1/4	56 1/2	2 1/2	1/4	2	56 1/2	2 1/2	1/4	2	145 3/4	35
Day-Elder E–5	3	1/4	1 1/2	1/4	69 1/2	3	1/4	2	69 1/2	3	1/4	2	156 3/4	37
Dearborn BW–2—1915–17–19–20	3	.....	1	.....	16 1/2	2 1/2	1/4	2	16 1/2	1 1/2	1/4	2	112	32
Dearborn F–1 1/2—1915–17–19–20	3	.....	1	.....	16 1/2	2 1/2	1/4	2	16 1/2	1 1/2	1/4	2	93	36
Dearborn C–1—1915–17–19–20	.....	.....	3/4	.....	38	2	1/4	1	38	2	1/4	1	107	32
Defiance B–1 1/2—1918–19–20	3	1/4	1	.....	45	2 1/2	1/4	1	43 1/8	2 1/4	1/4	1	116	34
Defiance C–2—1918–19–20	3	1/4	1	.....	54 1/16	2 1/2	1/4	1	52 1/2	2 1/4	1/4	1	116	34
De Kalb E2	3	1/4	1 1/4	1 1/4	28	3 1/2	1/4	1	28	3 1/2	1/4	1	120	30
De Kalb E2 1/2	3	1/4	1 1/4	1 1/4	28	3 1/2	1/4	1	28	3 1/2	1/4	1	132	32
Denby 12–1—1920	3	1/4	1	.....	43 1/2	2 1/2	1/4	1	39 1/2	1 3/4	1/4	1	95	34
Denby 134–2—1920	3	1/4	1	.....	51 1/4	2 1/2	1/4	1	47	2	1/4	1	129	34
Denby 25–2 1/2—1920	3	1/4	1 1/4	.....	55 3/4	3	1/4	1	51	2	1/4	1	142	34
Denby 27–3 1/2—1920	3	1/4	1 1/4	.....	61 1/2	3	1/4	1	58	2 1/2	1/4	1	186	34
Denby 210–5—1920	3	1/4	1 1/4	.....	89	2 1/4	1/4	1	89	2 1/4	1/4	1	186	34
Dependable C–1 1/2—1920	4	.....	1	.....	53 1/4	2 1/2	1/4	1	39 1/4	2 1/2	1/4	1	121	33
Dependable E–2 1/2—1920	4	.....	1	.....	62 1/2	2 1/2	1/4	1	48	2 1/2	1/4	1	152	33
Diamond T–FS&T–1 1/2	3	1/4	1	1 1/4	13 1/4	3 1/2	1/4	8	13 1/4	3 1/2	1/4	8	123 1/4	34
Diamond T–U–2	3	1/4	1	1 1/4	13 3/4	3 1/2	1/4	8	13 3/4	3 1/2	1/4	8	132	34
Diamond T–LB–3 1/2	3	1/4	1 1/4	1 1/2	16	3 3/4	1/4	8	16	3 3/4	1/4	8	142 1/2	37
Diamond T–S–5	3	1/4	1 1/4	1 3/4	18 1/2	4	1/4	8	18 1/2	4	1/4	8	156 3/8	37
Diehl A	3	.....	1	1	28	2 1/2	1/4	2	27	2	1/4	2	90	.....
Doane 2 1/2—1917–18–19	3	1/4	1 1/4	1/4	34 1/2	3	1/4	2	34	3	1/4	4	126	53
Doane 6.—1917–18–19	3	.....	1 1/2	1/4	37 1/2	3	1/4	2	46	4	1/4	4	168	64

Replacement Table—Continued

Name, Model, Tonnage and Year	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per cyl.	Width	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Dodge Brothers-½—1917-20	3	1/8	1	1/8	19¼	2¼	1/8	4	14¾	1¾	1/8	4	47⅜	38
Dorris K4-4—1918-20	3	¼	1¼	1¼	13½	3½	¼	4	13½	3½	¼	4	142¾	34
Dorris K7-3½—1919-20	3	¼	1¼	1¼	15¾	3¾	¼	4	15¾	3¾	¼	4	179½	36
Double-Drive C-1½			1		13	3	¼	2	15	3	¼	2	Opt	
Douglas 1			1¼	1/8	3	2	⅛	2	42	2	⅛	2	101	31½
Douglas 1½			1¼	¼	3	2	⅛	2	42	2	⅛	2	117	31½
Douglas 2½			1¼	¼	4	2½	¼	2	54	2½	¼	2	133	31½
Duplex E-3½	3	¼	1¼	1	9½	2½	¼	2	5½	2½	¼	2	126	39⅜
Duplex A			1¼	1½				4				4	121	34
Eagle 100-2	4	¼	1	1¼	49½	3	¼	1	47¼	2	¼	1	Opt	36
Ellsworth 25A-1½—1918-20	3	1/8	1¼	1¼	12	1¼	¼	4	12	1¼	¼	4	Opt	36
Elmira C1½-3½			1	1¼	24	1	⅛	1	24	1	⅛	1	60	30
Fageol 1½—1920	3	¼	1	1½	19¼	1¾	1/8	2	19¼	1¾	1/8	2	120	30
Fageol 2½—1917-20	3	¼	1	1	13¼	3½	¼	2	13¼	3¼	¼	2	135	34
Fageol 4500.—1917-20	3	¼	1⅝	2	15½	3¾	1/8	2	15½	3¾	1/8	2	161¼	37¾
Fageol 5300.—1917-20	3	¼	1⅝	2	18	4	1/8	2	18	4	1/8	2	161¼	37¾
Famous B10-1—1919-20	3	1/8	1	1/8	21	2¾	¼	1	48	2	1/8	2	94	34
Famous B12-1½—1919-20	3	1/8	1	1/8	21	2½	¼	1	48	2	1/8	2	94	34
Fargo O17, P18-2, P19-2, P20-2	3	1/8		1⅛	52	3	1/8	2	50½	2	1/8	2	132	33
Federal SD-1	4	1/8	1	1/8	10 1/16	3	¼	4	10 1/16	3	¼	4	112	34
Federal TE-1½	3	1/8	1¼	1½	13 1/8	3½	¼	4	13 1/8	3½	¼	4	118	34
Federal UE-2	3	1/8	1¼	1½	13 1/8	3½	¼	4	13 1/8	3½	¼	4	134	34
Federal WD-3½	3	1/8	1¼	1½	15⅝	3¾	¼	4	15⅝	3¾	¼	4	154	38
Federal XC-5	3	1/8	1¼	1½	17 1/16	4	¼	4	17 1/16	4	¼	4	154	38
Federal Light Duty	3	1/8	1¼	1½	13 1/8	3½	¼	4	13 1/8	3½	¼	4	86	34
Federal Heavy Duty	3	1/8	1¼	1½	15⅝	3¾	¼	4	15⅝	3¾	¼	4	82	38
Ford T-1	3	¼	1⅛	1/8	23⅜	1 1/16	1/16	1	12	1⅜	1/8	2	124	23
Front-Drive B4			1¼		29	2¼	¼	1	29	2¼	¼	1	120	
F.W.D. B-3	3	¼	1	1/8	27	3½	¼	1	43	2¾	¼	2	136	36
Gabriel E-2	3	¼	2¼	1¾		3¼	¼	4	13	3¼	¼	4	144	33
Gabriel F-4			2½	1¾		3¾	¼	4	16	3¾	¼	4	144	37
Garford 25-1¼—1920	3	1/8	1¼		11¾	3¼	¼	4	11¾	3¼	¼	4	108	34
Garford 70H-2—1920	4	¼	1¼		13 1/8	3½	¼	4	13 1/8	3½	¼	4	121	34
Garford 77D-3½—1920	4	¼	1¼		15⅝	3¾	¼	4	15⅝	3¾	¼	4	144	36
Garford 77C-3½—1920	4	¼	1¼		15⅝	3¾	¼	4	15⅝	3¾	¼	4	150	32
Garford 68-5—1920	3	¼	1¼		10½	4	3/8	2	21⅝	4	¼	4	150	32
Gary F-1	3	1/8	1	3/8	22½	3	¼	2	22½	3	¼	2	114	34
Gary GTI-1½	4	¼	1¼	3/8	24	3¼	¼	2	24	3¼	¼	2	120	34
Gary J-2½	4	¼	1¼	3/8	27	3½	¼	2	27	3½	¼	2	120	34
Gary K-3½	4	¼	1¼	3/8	32	3¾	¼	2	32	3¾	¼	2	148	36¾
Gary M-5	4	¼	1½	3/8	36½	4	¼	2	36½	4	¼	2	168	39
Gersix K-2½—1920	3	¼	1¼	1½	20	2½	¼	4	47	2¼	¼	2	131	34
Gersix M-1½—1920	3	¼	1¼	1½	46	2	¼	2	46	2	1/8	2	114	32
Giant 15-1	3	1/8	1		19	2	1/8	2	19	2	1/8	4	116½	32
Giant 16-2	3	1/8	1¼		45½	2	¼	2	45½	2	1/8	2	140½	33
Giant 17-3½	3	1/8	1½		56½	2½	¼	2	46½	2½	¼	2	183½	36
G.M.C. 16-¾—1916-20	3	1/8	1	1	40 1/16	1⅞	1/8	2	43 1/8	1⅞	1/8	2	92½	34
G.M.C. 31A-1½—1915-20	3	1/8	1	1	13 1/8	3½	¼	4	13 1/8	3½	¼	4	101	33
G.M.C. 31B-1½—1915-20	3	1/8	1	1	13 1/8	3½	¼	4	13 1/8	3½	¼	4	125	33
G.M.C. 41A-2—1915-20	3	1/8	1	1	13 1/8	3½	¼	4	13 1/8	3½	¼	4	125⅝	33
G.M.C. 41B-2—1915-20	3	1/8	1	1	13 1/8	3½	¼	4	13 1/8	3½	¼	4	149¾	33
G.M.C. 71A-3½—1916-20	3	1/8	1¼	1¼	15⅝	3¾	¼	4	15⅝	3¾	¼	4	144	38
G.M.C. 71B-3½—1916-20	3	1/8	1¼	1¼	15⅝	3¾	¼	4	15⅝	3¾	¼	4	192	38
G.M.C. 101A-5—1916-20	3	1/8	1¼	1¼	17 1/16	4	¼	4	17 1/16	4	¼	4	144	38
G.M.C. 101B-5—1916-20	3	1/8	1¼	1¼	17 1/16	4	¼	4	17 1/16	4	¼	4	192	38
Gramm-Bernstein 15-1½—1920	3	1/8	1	1½	48½	2	1/8	2	46½	1½	1/8	2	120	32
Gramm-Bernstein 65-1½—1920	3	1/8	1	1½	18	1¾	1/8	4	18	1¾	1/8	4	126	32
Gramm-Bernstein 20-2—1920	3	1/8	1¼	1½	22½	2	1/8	4	22½	2	1/8	4	126	32⅛
Gramm-Bernstein 25-2½—1920	3	¼	1¼	1½	22½	2¼	¼	4	22½	2¼	¼	4	132	36
Gramm-Bernstein 35-3½—1920	3	¼	1¼	1½	26	2¾	¼	4	26	2¾	¼	4	144	36
Gramm-Bernstein 50-5—1920	3	¼	1½	1¾	32½	2¾	¼	4	32½	2¾	¼	4	162	36
Grant 10-1½—1920	3	1/8	1		45	2½	1/8	2	43 1/8	2¼	1/8	2	104⅝	35⅛
Grant 11-1½—1920	3	1/8	1		45	2½	1/8	2	43 1/8	2¼	1/8	2	131⅞	35⅛
Grant 15-2—1920	3	1/8	1		54 1/8	2½	1/8	2	52 1/8	2¼	1/8	2	104⅝	35⅛
Grant 16-2—1920	3	1/8	1		54 1/8	2½	1/8	2	52 1/8	2¼	1/8	2	131⅞	35⅛
Grant 17A—1920	3	1/8	1		45	2½	1/8	2	43 1/8	2¼	1/8	2	131⅞	35⅛
Hall 2-Worm-2½	3	1/8			13½	3½	¼	2	13½	3½	¼	2	144	38
Hall 3½-Worm	3	1/8			16	3¾	¼	2	16	3¾	¼	2	180	39
Hall 5-Worm	3	1/8			18½	4	¼	2	18½	4	¼	2	144	39

Name, Model, Tonnage and Year	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per cyl.	Width	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Hall 7-Chain	3	1/8			37	2½	1/8	1	59	4	¼	1	180	39
Harvey WEA-1½—1919-20	4	¼			46	2	¼	2	46	2	¼	2	120	32
Harvey WFA-2½—1919-20	4	¼			52	2¼	¼	2	52	2¼	¼	2	126½	32
Harvey WHA-3½—1919-20	4	¼			56	2½	¼	2	56	2½	¼	2	144	35
Harvey WKA-5—1919-20	4	¼			69	3	¼	2	69	3	⅛	2	144	35
Hawkeye K-1½—1918-20	3	1/8	1¼	1½	48	2	1/8	2	47	1½	1/8	2	112	34
Hawkeye M-2. —1919-20	3	1/8	1¼	1½	54	2½	1/8	2	52	2	1/8	2	112	34
Hendrickson I-2½	3	¼	1¼	1/8	12	3½	1/8	4	12	3½	1/8	4	Opt	32½
Hendrickson J-3½	3	¼	1¼	1/8	16	3¾	¼	4	16	3¾	¼	4	Opt	36
Hendrickson K-5	3	¼	1½	1/8	18	4	¼	4	18	4	1/8	4	Opt	38
Highway-Knight A	4	¼	1½	1¾	57	2½	¼	1	57	2½	¼	1	150	38
Highway-Knight B-5	4	¼	1½	1¾	69	3	¼	1	69	3	¼	1	50	38
Higrade A18-1—1918-19	3	¼	1	1	12	1½	¼	2	12	1½	¼	2	85	32
Higrade B20-1½—1919-20	3	¼	1⅛	1⅛	18	2	¼	2	18	2	¼	2	102	32
Hood C	3	¼	1	¼	23	1	1/8	1	23	2½	1/8	2	30	28
Hoover 15B-1	3	1/8	1	1¾	16	1¾	1/8	2	16	1¾	⅛	2	82	35½
Hoover 20A-1½	3	1/8	1	1¾	19	2	1/8	2	19	2	1/8	2	105	33
Huffman B-1½—1919-20	3	1/8	1	1/8	44	2¼	1/8	2	44	1½	1/8	2	123	32
Huffman C-1½—1919-20	3	1/8	1	1/8	46	2½	1/8	2	44	2¼	1/8	2	123	32
Hurlburt A1½-2	3	¼	1¼	1	22	2	¼	2	22	2	¼	2	132	35½
Hurlburt B2½	3	1/8	1¼	1	24	2½	¼	2	23	2½	¼	2	154	34
Hurlburt C3½-4	3	¼	1½	1¼	26	3	¼	2	25	3	¼	2	144½	34
Hurlburt D5-5½	3	¼	1½	1¼	28	3	¼	2	27	3	¼	2	144½	34
Indiana 12-1¼—1920	3	¼	1		17½	2	1/8	8	17½	2	1/8	8	108	32
Indiana 20-2—1920	3	¼	1¼		44	2	¼	4	44	2	¼	4	126	33
Indiana 25-2½—1920	3	¼	1¼		51	2¼	¼	4	51	2¼	¼	4	138	33
Indiana 35—1920	3	¼	1¼		56	2¼	¼	4	56	2½	¼	4	144	34½
Indiana 50-5—1920	3	¼	1¼		68	3	¼	4	68	3	¼	4	156	37½
International H-¾—1916-20	3	¼	1¼	1¾	43¾	2¼	1/8	2	43¾	2¼	1/8	2	75 1/16	34
International F-1—1916-20	3	¼	1¼	1¾	43¾	2¼	1/8	2	43¾	2¼	1/8	2	88 1/8	34
International K-1½—1918-20	3	¼	1¼	1¾	50⅝	2¼	1/8	2	50⅝	2¼	1/8	2	92 1/16	34
International G-2—1918-20	4	¼	1¼	1¾	50⅝	2¼	1/8	2	50⅝	2¼	1/8	2	118 1/16	34
International L-3½—1920	4	¼	1¼	1¾	73 1/8	2½	1/8	2	73 1/8	2½	1/8	2	147⅞	34
Jackson B-3½	3	1/8	1¼	2	51¾	3½	¼	2					150	36
Jones 31A-1	3	1/8	1	1/8	41 1/16	2½	¼	2	39¾	1¾	¼	2	100½	36
Jumbo 15-1½—1919	4	¼		1	48½	2	1/8	2	47	1½	1/8	2	120	32
Jumbo 20-2—1919	4	¼		1	48½	2	1/8	2	47	1½	1/8	2	120	32
Jumbo 25-2½—1917-19	3	¼		1¼	49¾	3	1/8	2	47½	2½	1/8	2	116	34
Jumbo 30-3—1917-19	3	¼		1¼	49¾	3	1/8	2	47½	2½	1/8	2	116	34
Jumbo 35-3½—1919	4	¼		1¼	60½	3	1/8	2	58½	2½	1/8	2	144	36
Jumbo 40-4—1919	4	¼		1¼	60½	3	1/8	2	58½	2½	1/8	2	144	36
Kalamazoo G-1½	3	¼	1	1/8	50	2½	1/8	1		2½	1/8	1	126	32½
Kalamazoo H-2½	3	¼	2	1/8	60	2½	1/8	1	48	2½	1/8	1	148	33
Kalamazoo K-3½	3	¼	2	1/8	60	2½	1/8	1	60	2½	1/8	1	151	36
Kankankee E-2½—1919-20	3	¼	1	1¼	51	3	1/8	2	50	2	1/8	2	148	32
Keldon 19-2	4	¼	1¼	1¼	48	3	1/8	1	45	3	1/8	1	132	34
Kelly-Springfield K31-1½	4	¼	1	1/8	16¾	1⅞	1/8	4	16¾	1⅞	1/8	4	141	34
Kelly-Springfield K32-1½	4	¼	1	1/8	17⅜	1⅞	1/8	4	17⅜	1⅞	1/8	4	141	34
Kelly-Springfield K35-2½	4	¼	1	1/8	16¾	1⅞	1/8	4	16¾	1⅞	1/8	4	141	34
Kelly-Springfield K36-2½	4	¼	1	1/8	17⅜	1⅞	1/8	4	17⅜	1⅞	1/8	4	141	34
Kelly-Springfield K40-3½	4	¼	1½	1/8	21	2⅞	1/8	4	21	2⅜	1/8	4	145	38
Kelly-Springfield K45-4	4	¼	1½	1/8	21	2⅞	1/8	4	21	2⅜	1/8	4	145	38
Kelly-Springfield K50-5	4	¼	1½	1/8	21	2⅞	1/8	4	21	2⅜	1/8	4	145	38
Kelly-Springfield K60-6	4	¼	1½	1/8	21	2⅞	1/8	4	21	2⅜	1/8	4	145	83
Keystone 40-2—1919-20	3	¼	1	1/8	50½	3	1/8	1	46¾	2	1/8	1	124	33
Keystone-1—1920	3	¼	1	¼	41¾	2	1/8	1	41¼	2	1/8	1	95	33
Kimball AB-1½	3		1¼		50	2¼	¼	4	33	3½	¼	1	135	34
Kimball AC-2½	3		1¼		52	2½	¼	4	33	3½	¼	1	152	34
Kimball AK-3	3		1½		52	2½	¼	4	33	3½	¼	1	152	34
Kimball AE-4	3		1½		58	3	¼	2	58	3	¼	2	171	36
Kimball AF-5	3		1½		65	3	¼	2	65	3	¼	2	171	36
King-Zeitler 1½—1919-20	3	1/8	1	1¼	48	3¼	¼	4	48	3¼	¼	4	Opt	32
King-Zeitler 2½—1919-20	3	1/8	1	1¼	54	3½	¼	4	54	3½	¼	4	Opt	32
King-Zeitler 3½—1919-20	3	1/8	1¼	1¼	63	3¾	¼	4	63	3¾	¼	4	Opt	36
Kissel-Delivery-1¼—1920	3	1/8		1¼	44¼	2	1/8	2	44¼	2	1/8	2	96	33½
Kissel-Utility-1½—1917-20	3	1/8		1¼	19	2	1/8	4	19	2	1/8	4	120	34
Kissel-Freighter-2—1917-20	3	1/8		1¼	14	3½	¼	4	14	3½	¼	4	144	34
Kissel-Heavy-Duty-3½—1917-20	3	1/8		1¼	56	2½	1/8	2	56	2½	1/8	2	156	36
Kissel-Goliath-5—1919-20	3	1/8		1¼	56	2½	1/8	2	56	2½	1/8	2	168	36

Name, Model, Tonnage and Year	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per cyl.	Width	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Kleiber 1	...	...	1¼	1¼	...	...	...	...	...	...	...	...	120	34
Kleiber 1½	...	...	1¼	1¼	...	...	...	...	...	...	...	...	132	34
Kleiber 2	...	...	1¼	1¼	...	...	...	...	...	...	...	...	144	34
Kleiber 2½	...	...	1¼	1¼	...	...	...	...	...	...	...	...	150	34
Kleiber 3½	...	...	1¼	1¼	...	...	...	...	...	...	...	...	156	34
Kleiber 5	...	...	1½	1¼	...	...	...	...	...	...	...	...	168	38
Knox 35—1915–20	4	¼	1½	...	...	4	...	2	57¾	6½	¼	1	27	28
Knox 36–3—1915–20	4	¼	1½	...	...	4	...	3	57¾	6½	¼	1	96⅛	28
Koehler C 1¼—1919–20	3	⅛	1	¼	47	2½	⅛	2	46	2¼	⅛	2	108	34
Koehler M 2½—1919–20	4	⅛	1¼	⅛	13½	3½	¼	4	13½	3½	¼	4	144	34
Lange–2	3	...	...	...	30	2	¼	2	18	3	¼	4	114	37
Larrabee-Deyo U–1½—1919–20	3	⅛	1¼	...	48	2	¼	2	48	2	¼	2	108	34
Lar.-Deyo A, B '18–19 & L–'20–3½	3	⅛	1¼	...	60	2½	¼	2	60	2½	¼	2	132	36
Lar.-Deyo C, D'18–19 & K'20–2½	3	⅛	1¼	...	54	2¼	¼	2	54	2¼	¼	2	132	36
Larrabee-Deyo W–5—1920	3	⅛	1½	...	72	3	¼	2	72	3	¼	2	160	36
Larrabee-Deyo T—1918–19	3	⅛	1¼	...	72	3	¼	2	72	3	¼	2	162	36
L. M. C.–2½—1919–20	3	⅛	1⅛	1½	55	3	⅛	2	50½	2	⅛	2	143	32
Lombard 140 H.P.	...	...	...	...	...	...	...	...	...	...	...	...	120	72
Luedinghaus K2—1919–20	3	¼	1¼	1 11/16	37.7	2½	¼	2	53.4	2½	¼	2	120	34
Luedinghaus K2–LS—1920	3	¼	1¼	1 11/16	37.7	2½	¼	2	53.1	2½	¼	2	145½	34
Luverne BBL–2	3	⅛	1¼	1¼	...	2½	¼	2	...	2½	¼	2	108	34
Maccar S–1—1920	3	⅛	1	⅝	10¼	3	¼	4	10¼	3	¼	4	117½	33
Maccar L–1¼—1915–19	3	⅛	1¼	⅝	11⅛	3¼	¼	4	11⅛	3¼	¼	4	128½	34
Maccar H–2½—1915–20	3	⅛	1¼	⅝	13	3½	¼	4	13	3½	¼	4	143⅝	34
Maccar M–3½—1915–17–19–20	3	⅛	1¼	⅝	15⅛	3¾	¼	4	15⅛	3¾	¼	4	155⅜	34
Maccar G–5½	3	¼	1½	⅝	17¾	4	¼	4	17¾	4	¼	4	167	37½
Mack AB 1½, 2 Ton-Chain '16–20	3	⅛	1¼	¼	12¼	4	¼	2	16½	2½	¼	4	Opt	33¼
Mack AB 1½, 2 Ton-Worm '16–20	3	⅛	1¼	¼	13⅛	3½	¼	4	13⅛	3½	¼	4	Opt	33¼
Mack AB-Tractor 5 Ton—'16–20	3	⅛	1¼	¼	12¼	4	¼	2	16½	2½	¼	4	77	33¼
Mack AC 3½ to 7½ Ton—'16–20	4	¼	1½	¼	16⅛	3	¼	4	20½	3½	¼	4	Opt	37½
Mack AC Trac. 7to15Ton—'16–20	4	¼	1½	¼	16⅛	3	¼	4	20½	3½	¼	4	87	37½
Master JI–1½—1919–20	3	⅛	1¼	2	74½	2½	⅛	1	74½	2¼	¼	1	117¾	34½
Master JW–1½—1919–20	3	⅛	1¼	2	12	3¼	¼	2	12	3¼	¼	2	117¾	34⅛
Master M–2½—1916–20	3	¼	1¼	2	74½	2½	⅛	1	74½	2¼	¼	1	117¾	34
Master O–2½—1917–20	3	¼	1¼	2	74½	2½	⅛	1	74½	2¼	¼	1	156⅜	34
Master W–2½—1916–20	3	¼	1¼	2	13¼	3½	¼	2	13¼	3½	¼	2	117⅜	34
Master WL–2½—1917–20	3	¼	1¼	2	13¼	3½	¼	2	13¼	3½	¼	2	156⅜	34
Master T–6 Tractor—1917–20	3	¼	1¼	2	74½	2½	⅛	1	74½	2¼	¼	1	72⅛	34
Master A–3½—1918–20	4	¼	1½	1¾	16	3¾	¼	2	16	3¾	¼	2	147¾	36¾
Master AL–3½—1918–20	4	¼	1½	1¾	16	3¾	¼	2	16	3¾	¼	2	183¾	36¾
Master B–5—1919–20	4	¼	1½	1¾	18	4	¼	2	18	4	¼	2	162⅞	39
Master BL–5—1919–20	4	¼	1½	1¾	18	4	¼	2	18	4	¼	2	186⅞	39
Maxwell 1½1917–20	3	⅛	1	1	16	1¾	⅛	4	16	1¾	⅛	4	102	36
Menominee HT–1—1918–20	3	⅛	1	1½	12	3¼	¼	8	...	...	...	...	104	32
Menominee H–1½—1916–20	3	⅛	1¼	1¾	13½	3½	¼	8	...	...	...	...	122	32
Menominee D–2.—1915–20	3	⅛	1¼	1¾	13½	3½	¼	8	...	...	...	...	146	32
Menominee G–3½—1916–20	3	¼	1½	2	16	3½	¼	8	...	...	...	...	155	36
Menominee J–5—1917–20	3	⅛	1½	2	18½	4	¼	8	...	...	...	...	156	38
Moreland 19B–1½—1918–19	3	⅛	1¼	1¾	12	3¾	¼	4	12	3¼	¼	4	132	34
Moreland 19C–2½—1918–19	3	⅛	1½	1¾	13½	3½	¼	4	13½	3½	¼	4	156	34
Moreland 19G–4—1918–19	3	¼	1½	1¾	16	3¾	¼	4	16	3¾	¼	4	168	38
Moreland 19J–5—1918–19	3	¼	1½	1¾	18	4	¼	4	18	4	¼	4	168	38
Muskegon 20–2	3	⅛	1¾	2	54	2½	⅛	2	53	2¼	⅛	2	119½	34
Mutual–2—1919–20	3	¼	1 1/16	1¼	51	2¼	¼	2	51	2¼	¼	2	128¾	34
Mutual 2A—1919–20	3	¼	1 1/16	...	51	...	...	2	51	...	...	...	128¾	34
Napoleon 9–1—1919–20	3	¼	1	⅛	44	2	⅛	1	30	2½	⅛	1	102	35
Napoleon 11–1½—1919–20	3	¼	1	⅛	49	2	⅛	1	30	2½	⅛	1	102	35
Nash 2018–1—1919–20	4	¼	1¼	1¼	49 1/16	2	⅛	2	20 1/16	2½	⅛	1	104½	30½
Nash 3018–2—1919–20	4	¼	1¼	1¼	50 1/16	3	⅛	2	20 1/16	2½	⅛	1	118¾	31½
Nash 4017–2—1919–20	3	¼	1¼	1¼	49¼	2½	¼	4	25 1/16	2½	¼	1	117⅜	38⅛
Nelson & LeMoon F1	3	⅛	1¼	⅛	12	3¼	¼	2	12	3¼	¼	2	Opt	.....
Nelson & LeMoon F1½	3	⅛	1¼	⅛	12	3¼	¼	2	12	3¼	¼	2	Opt	.....
Nelson & LeMoon F2	3	⅛	1¼	⅛	12	3¼	¼	2	12	3¼	¼	2	Opt	.....
Nelson & LeMoon F3½	3	¼	1¼	⅛	16½	3¾	¼	2	16½	3¾	¼	2	Opt	.....
Nelson & LeMoon F5	4	¼	1½	⅛	18	4	¼	2	18	4	¼	2	Opt	.....
Netco D–2	3	⅛	1¼	1⅛	12	3¼	¼	4	12	3½	¼	4	116	34
Netco H–2½	3	⅛	1½	1⅛	13	3½	¼	4	13	3½	¼	4	144	34
Niles E–2	3	⅛	1¾	1¼	12	3¼	¼	2	12	3¼	¼	2	114	.....
Noble A20–1—1919–20	4	⅛	1	...	...	...	...	...	...	...	...	...	124	34
Noble B30–1½—1918–20	4	⅛	1	1⅛	45	2	¼	2	45	2	¼	2	136	34
Noble C40–2—1919–20	4	¼	1¼	1⅛	45	2	¼	2	45	2	¼	2	148	34
Noble D50–2½—1919–20	4	¼	1¼	1⅛	51	2¼	¼	2	51	2¼	¼	2	172	34

Name, Model, Tonnage and Year	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Noble E70–3½– 1919–20	4	¼	1¼	1⅛	56	2½	¼	2	56	2½	¼	2	172	36
Northway B2–2	3	⅛	1⅛	1¼	50½	2¼	¼	2	50½	2¼	¼	2	133	33
Northway B3–3½	3	⅛	1⅛	1¼	54	2½	¼	2	54	2½	¼	2	148	34½
O. K.–1½—1920	3	⅛	1¼	...	43	2½	⅛	1	58	2½	⅛	1	125	35
O. K.–2½—1920	3	⅛	1¼	...	43	2½	⅛	1	58	2½	⅛	1	125	35
Old Hickory W–1—1919	3	⅛	1	1	24	2¼	¼	2	24	2¼	¼	2	120	36
Old Reliable A–1½—1918–20	3	¼	1¼	1¼	48	2½	¼	1	48	2½	¼	1	105	32
Old Reliable B–2½—1918–20	3	¼	1¼	1¼	54	2	¼	1	54	2	¼	1	144	32
Old Reliable C–3½—1918–20	3	¼	1¼	1¼	60	2½	¼	1	60	2½	¼	1	150	32
Old Reliable D–5—1918–20	3	¼	1½	1½	72	2½	¼	1	72	2½	¼	1	156	34
Old Reliable K, L, M–7—1918–20	3	¼	1½	1½	54	3½	¼	1	60	4	¼	1	158	36
Oldsmobile T–¾—1919–20	3	⅛	1	⅛	42¼	2	⅛	1	41	2	⅛	1	92⅝	34
Oneida A 9–1¾	3	⅛	1	...	48	2½	⅛	2	34	2½	⅛	2	106	34
Oneida B 9–1¾	3	⅛	1¼	...	48	2½	⅛	2	34	2½	⅛	2	114	34
Oneida C 9–2½	3	⅛	1¼	...	58	2½	⅛	2	43	2½	⅛	2	138	34
Oneida D 9–3½	3	¼	1¼	...	15⅝	3¾	⅛	4	16	4	⅛	4	150	36
Oneida E 9–5	3	¼	1¼	...	18	4	¼	4	18	4	¼	4	180	38
Oshkosh A–2	3	⅛	1¼	2	23½	3	¼	1	43	2½	⅛	2	108⅝	34
Oshkosh AA–2	3	⅛	1¼	2	23⅝	3	¼	1	43	2½	⅛	2	143⅝	34
Packard B., E.	3	¼	1⅝	1¾	7	4¾	¼	2	14	2	⅛	2	126	31¾
Packard C., E.	3	¼	1⅝	1¾	7	4¾	¼	2	14	2	⅛	2	132	31¾
Packard D., E.	3	¼	1⅝	1¾	9	4¾	¼	2	17	3	⅛	2	144	39
Packard E., E.	3	¼	1⅝	1¾	9	4¾	¼	2	18¾	3	⅛	2	144	39
Packard F., E.	3	¼	1⅝	1¾	9	6½	¼	2	18¾	3½	⅛	2	144	39
Packard G., E.	3	¼	1⅝	1¾	9	6½	¼	2	18¾	3½	⅛	2	144	39
Paige 50–18–2½	3	⅛	...	...	48⅞	2¼	¼	2	48⅛	2	¼	2	126	33
Paige 51–18–3½	3	⅛	...	...	15⅝	3¾	¼	4	15⅝	3¾	¼	4	144	35
Paige 52–19–1½	3	⅛	...	...	...	...	...	...	...	...	...	...	126	33
Parker F20–2—1920	3	...	1¼	...	10¾	5	¼	2	19	2½	¼	4	127	33
Parker J20–3½—1920	3	...	1¼	...	10¾	5	¼	2	19	3½	¼	4	139½	33
Parker M20–5—1920	3	...	1½	...	10¾	5	¼	2	24½	4	¼	4	145	37
Patriot Lincoln–2	3	⅛	1⅛	1 11/16	41	1¾	¼	2	41	1¾	¼	2	112	34
Patriot Revere–1	3	⅛	1 1/16	1⅛	41	1¾	¼	2	41	1¾	¼	2	92½	33¼
Patriot Washington–3	3	⅛	1⅛	1 11/16	55	2¼	¼	2	55	2¼	¼	2	150	34
Pierce-Arrow 5	3	⅛	1½	1¾	7¼	3½	⅛	2	18	4	¼	4	144 1/16	38⅛
Pierce-Arrow 2	4	¼	1⅞	1¾	8 1/16	5	⅛	2	18 11/16	3	⅛	4	126 11/16	34⅛
Pittsburgher 2½—1919–20	3	⅛	1¼	1¼	44	2¼	¼	2	44	2¼	¼	2	136	33
Pony ¼	3	⅛	⅞	⅞	...	...	...	...	10	1½	⅛	2	40	24
Pony 2	3	¼	1¼	1½	...	...	...	...	...	...	...	...	132	33
Pony 3½	4	¼	1¼	1½	...	...	...	...	...	...	...	...	156	36
Rainier R6–1½	3	⅛	1	⅛	19	2	⅛	2	19	2	⅛	2	102	34
Rainier R9	3	⅛	1	⅛	19	2	⅛	2	19	2	⅛	2	102	34
Rainier R11–¾	3	⅛	1	⅛	11¼	3	⅛	2	11¼	3	⅛	2	87¾	34
Reliance A10–1½—1920	3	¼	1¼	⅜	17	2	⅛	4	17	2	⅛	4	122	32
Reliance B20–2½—1920	3	¼	1¼	⅜	17	2	⅛	4	17	2	⅛	4	127	32
Reo F—2500-lbs	3	⅛	1	1	43	2¼	⅛	1	31½	2	⅛	2	82	30
Republic 10–1—1919–20	3	⅛	1	.....	45	2½	⅛	2	43	2¼	⅛	2	.....	34
Republic 11X–1½—1919–20	3	⅛	1	.....	54¾	2½	⅛	2	52½	2¼	⅛	2	.....	34
Republic 19–2½—1919–20	3	⅛	1¼	.....	54¾	2½	⅛	2	52½	2¼	⅛	2	121	34
Republic 20–3½—1919–20	3	¼	1¼	.....	55¾	3½	⅛	2	31	4½	⅛	1	146	37
Reynolds 3A–1½	3	⅛	1¼	.....	46	2	⅛	2	46	2	⅛	2	121	33
Reynolds 5A–2½	3	⅛	1¼	.....	52½	2¼	⅛	2	52½	2¼	⅛	2	126	33
Reynolds 7A–3½	3	⅛	1¼	.....	57	2½	⅛	2	57	2½	⅛	2	148	37
Reynolds 10A–5	3	⅛	1¼	.....	70	3	⅛	2	70	3	⅛	2	148	37
Riker B3, BB–4	5	¼	...	...	7¼	4½	⅛	2	20	4	⅛	4	150	38
Rowe CW–1½—1918–19	...	...	1	⅛	19	2	⅛	8	19	2	⅛	8	121½	33
Rowe CDW2—1916–20	4	¼	1¼	⅛	45	2	⅛	4	45	2	⅛	4	123	33
Rowe CDW2½—1918–20	4	¼	1¼	⅛	51½	2½	⅛	4	51½	2½	⅛	4	147	33
Rowe DEW3½—1918–20	4	¼	1¼	⅛	56½	2½	⅛	4	56½	2½	⅛	4	150	36
Rowe FW5—1914–20	4	¼	1½	⅛	68	3	⅛	4	68	3	⅛	4	156	38½
Rowe GW3—1916–17, 1919	3	⅛	1¼	⅛	...	...	...	...	...	...	...	...	144	33
Sandow G–1—1918–20	3	⅛	1	⅛	20	2	⅛	2	20	2	⅛	2	96	34
Sandow CG–1½—1918–20	3	⅛	1	⅛	20	2	⅛	2	20	2	⅛	2	120	34
Sandow I–2—1918–20	3	⅛	1	⅛	60	3	⅛	1	60	3	⅛	1	132	32
Sandow J–2½—1918–20	3	⅛	1¼	⅛	13½	3½	¼	2	16	3½	¼	2	144	37
Sandow L–5—1918–20	3	⅛	1¼	⅛	24	4½	¼	2	24	4½	¼	2	144	37
Sandow M–3½—1918–20	3	⅛	1¼	⅛	18½	4	¼	2	18½	4	¼	2	144	37
Sanford 25–2½—1917–20	3	⅛	1¼	1¼	51½	2¼	⅛	1	51½	2½	⅛	1	144	35
Sanford W35–3½—1917–20	3	⅛	1¼	1¼	56	2½	⅛	1	56	2½	⅛	1	145	35
Sanford W50–5—1917–20	3	⅛	1¼	1¼	69	3	⅛	1	69	3	⅛	1	145	35
Schacht 2	3	⅛	1¼	.....	8½	3½	¼	2	13½	3	⅛	4	120	35¼
Schacht 2½	3	⅛	1¼	.....	8½	3½	¼	2	13½	3	⅛	4	140	35¼

Replacement Table—Continued

Name, Model, Tonnage and Year	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Schacht 3½	3	¼	1¼	.....	8½	3½	¼	4	13½	3	5/16	4	152	35¾
Schacht 5	3	¼	1¼	.....	8½	3½	¼	4	15	4	⅜	4	152	35¾
Selden 1½A—1919–20	3	5/16	1	1 5/16	11 11/16	3¼	5/16	2	11 11/16	3¼	.....	2	114	34
Selden 2½A—1919–20	3	5/16	1	1 5/16	13½	3½	5/16	2	13½	3½	.....	2	144	34
Selden 3½A—1919–20	3	5/16	1¼	1 5/16	15¾	3¾	5/16	2	15¾	3¾	5/16	2	195	37½
Selden 5A—1920	3	5/16	1¼	1 5/16	18	4	5/16	2	.....	4	5/16	2	168	.....
Service 220–1—1919–20	3	5/16	1 5/16	1 5/16	12	3¼	¼	2	12	3¼	¼	2	109½	34
Service 31–1½—1919–20	3	¼	1 11/16	1 11/16	12	3¼	¼	2	12	3¼	¼	2	121 5/16	34
Service 36–1½—1919–20	3	¼	1 11/16	1 11/16	12	3¼	¼	2	12	3¼	¼	2	121 5/16	34
Service 51–2½—1919–20	3	¼	1 11/16	1 11/16	13½	3½	¼	2	13½	3½	¼	2	131 1/16	34
Service 71–3½—1919–20	3	¼	1 11/16	1 11/16	16	3¾	¼	2	16	3¾	¼	2	150¼	38
Service 76–3½—1919–20	3	¼	1 11/16	1 11/16	16	3¾	¼	2	16	3¾	¼	2	145¾	38
Service 101–5—1919–20	3	¼	1 11/16	1 11/16	18½	4	¼	2	18½	4	¼	2	145¾	38
Shaw M2—1918–20	.....	.....	1	5/16	49	2½	¼	2	45	2½	¼	2	60	43
Shaw M4—1918–20	.....	.....	1	5/16	11	3	¼	4	11	3	¼	4	92	32
Signal F–1	3	5/16	1 5/16	1 11/16	12	3¼	¼	2	12	3¼	¼	2	211	34
Signal H–1½	3	5/16	1 5/16	1 11/16	12	3¼	¼	2	12	3¼	¼	2	211	34
Signal J–2½	3	5/16	1 5/16	1 11/16	13½	3½	¼	2	13½	3½	¼	2	220	34
Signal M–3½	3	5/16	1 5/16	1 11/16	16	3½	¼	2	16	3½	¼	2	268	38
Signal R–5	3	¼	1⅞	1⅞	18	4	¼	2	18	4	¼	2	280	38
Standard 56–1	3	5/16	1	1 5/16	10⅞	3	¼	4	10⅞	3	¼	4	120	32
Standard 76–2½	3	5/16	1¼	1 11/16	13 3/16	3½	¼	4	13 3/16	3½	¼	4	122	32
Standard 66–3½	3	5/16	1¼	1 11/16	15⅝	3¾	¼	4	15⅝	3¾	¼	4	144	38
Standard 86–5	3	5/16	1¼	1 11/16	17 11/16	4	¼	4	17 11/16	4	¼	4	144	38
Sterling 1½—1920	3	¼	1¼	¼	11⅝	3¼	¼	8	11⅝	3¼	¼	8	120	33½
Sterling 2—1920	3	¼	1¼	¼	13 3/16	3½	¼	8	13 3/16	3½	¼	8	120	33½
Sterling 2½—1920	3	¼	1¼	¼	13 3/16	3½	¼	8	13 3/16	3½	¼	8	138	34
Sterling 3½—1920	3	¼	1¼	¼	15½	3¾	¼	8	15½	3¾	¼	8	144	38
Sterling 5-Worm—1920	3	¼	1¼	¼	18	4	¼	8	18	4	¼	8	158	38
Sterling 5-Chain—1920	3	¼	1¼	¼	56½	3½	¼	2	28¾	4	¼	1	158	38
Sterling 7½—1920	3	¼	1¼	¼	56½	3½	¼	2	28¾	4	¼	1	158	38
Stewart M7–2—1918–20	3	5/16	.....	1 5/16	50 5/16	2	5/16	2	8	5	5/16	2	132¾	32
Stewart M12–1—1920	3	5/16	.....	1	41 3/16	2	5/16	2	22¾	2	5/16	1	99½	32
Stewart M9–1½—1918–20	3	5/16	.....	1	48½	2	5/16	2	8	5	5/16	2	119¼	32
Stewart M10–3½—1918–20	3	5/16	.....	1 5/16	60	3	5/16	2	8	5	5/16	2	139¾	32
Stewart M11–¾—1919–20	3	5/16	.....	⅞	41 3/16	2	5/16	2	22¾	2	5/16	1	77¼	32
Stewart M7X—1920	3	5/16	.....	1 5/16	50 5/16	2	5/16	2	8	5	5/16	2	132½	32
Stewart M10X—1920	3	5/16	.....	1 5/16	60	3	5/16	2	8	2	5/16	2	139	32
Stoughton B–1½	.....	.....	1	1 5/16	19	2	¼	2	19	2	¼	1	120	34
Stoughton D–2	4	.....	1¼	1 5/16	45	2	¼	1	45	2	¼	1	126	34
Stoughton E–2½	4	.....	1¼	1 5/16	52	2¼	5/16	1	52	2¼	¼	1	136	36
Success B–2½	.....	.....	1⅞	¼	55	2¼	¼	1	55	2¼	¼	1	132	32¼
Sullivan E–2—1916–20	3	¼	1 5/16	1 5/16	13	3½	¼	8	13	3½	¼	8	144	34
Sullivan F–1½—1917–20	3	5/16	1 5/16	1 11/16	13	3½	¼	8	13	3½	¼	8	106	33½
Superior D–1—1919–20	3	5/16	1 5/16	1 5/16	45	2½	¼	2	44	2¼	5/16	2	97¾	34
Superior E–2—1919–20	3	5/16	1 5/16	1 5/16	54	2½	¼	2	53½	2½	5/16	2	114	34
Texan TK39–¾	3	5/16	1	1 5/16	17½	2¼	5/16	4	17½	1½	5/16	4	100	36
Tiffin GW–1½—1919–20	3	5/16	1¼	1 5/16	46	2	¼	1	46	2	¼	1	114	35
Tiffin MW–2½—1919–20	3	5/16	1¼	1 5/16	52	2¼	¼	1	52	2¼	¼	1	138	32¾
Tiffin PW–3½—1919–20	3	5/16	1¼	1 5/16	58	2½	¼	1	58	2½	¼	1	151	35½
Tiffin TW–5—1919–20	3	5/16	1¼	1 5/16	58	3	¼	1	58	2½	¼	1	156	38½
Tiffin UW–6—1919–20	3	5/16	1¼	1 5/16	58	3	¼	2	58	2½	¼	2	156	38½
Titan 3½—1919	3	¼	1½	1 5/16	60	2¼	5/16	2	14	4½	5/16	2	144	34
Titan 5–6—1918–20	3	¼	1½	1 5/16	90	2¼	5/16	2	14	4½	5/16	2	144	34
Titan 2½—1920	3	¼	1¼	1 5/16	54	2⅛	5/16	2	26	4	5/16	1	144	32
Tower J–1¼—1920	3	5/16	1¼	1 5/16	11¾	3¼	¼	4	11¾	3¼	¼	4	135½	32½
Tower H–2½—1919–20	3	5/16	1¼	1 5/16	13 3/16	3½	¼	4	13 3/16	3½	¼	4	139	32½
Tower G–3½—1919–20	3	¼	1½	1 5/16	15⅝	3¾	¼	4	15⅝	3¾	¼	4	152 11/16	37
Traffic C–2—1919–20	3	5/16	1	5/16	43½	2½	5/16	2	38	1⅝	5/16	2	120¾	42
Transport 20–1	3	5/16	.....	.....	48 7/16	2	5/16	2	45 7/16	1½	5/16	2	101	34
Transport 30–1½	3	5/16	.....	.....	48 7/16	2½	5/16	2	45 7/16	1½	5/16	2	117	34
Transport 50–2½	3	5/16	.....	.....	50 5/16	3	5/16	2	48½	2¼	5/16	2	123	34
Traylor B–1	.....	.....	1¼	1½	50	2	5/16	2	50	2	5/16	2	117	34
Traylor C–1½	.....	.....	1¼	1½	50	2	5/16	2	50	2	5/16	2	120	34
Traylor D–2½	.....	.....	1¼	1½	56½	2¼	5/16	2	56½	2¼	5/16	2	142	34
Triangle AA–1¼—1920	3	.....	1	1	23 5/16	2½	5/16	1	41	2	5/16	1	94	35
Triangle A–1½—1918–20	3	.....	1	1	10	4	5/16	2	49	2	5/16	1	126	34
Triangle B–2½—1919–20	3	.....	1¼	1¼	10	4	5/16	2	52	3	5/16	1	132	34
Triangle C–2—1920	3	.....	1	1	10	4	5/16	2	52	3	5/16	1	128 5/16	34

Name, Model, Tonnage and Year	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per cyl.	Width	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Triumph 1½	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	120	.....
Twin City A–3½ & B–5	3	.....	2	2	16	3½	5/16	2	48	3½	¼	2	138	46
Ultimate–1½	4	¼	1 5/16	1 5/16	45	2	¼	2	45	2	¼	2	120	32¾
Ultimate–2½	4	¼	1 5/16	1⅛	51	2¼	¼	2	51	2¼	¼	2	131	32¾
Union F–2½	3	¼	1¼	1	55	3	5/16	1	50	2	5/16	1	144	32
Union H–4	3	¼	1¼	1	19	3½	5/16	2	10	4	5/16	1	168	34
United–1½	.....	.....	1	1 5/16	48	2	5/16	1	48	1½	5/16	1	120	33
United–2½	.....	.....	1¼	1 11/16	49	3	5/16	1	49	2½	5/16	1	Opt	33
United–3½	.....	.....	1¼	1 11/16	62	3	5/16	1	58	2½	5/16	1	Opt	34
United–5	.....	.....	1½	1 11/16	88½	2¾	5/16	1	88½	2¾	5/16	1	Opt	38
U.S.N.–1½	3	5/16	1	5/16	50½	2	¼	2	46½	1½	¼	2	120	34
U.S.R.–3	3	5/16	1¼	¼	46	2¼	¼	2	46	2¼	¼	2	144	34
U.S.S.–4	3	5/16	1½	¼	50	2½	¼	2	50	2½	¼	2	156	36
U.S.T.–5	3	¼	1½	¼	62	3	¼	2	62	3	¼	2	168	36
Velie 46–1½—1919–20	3	5/16	1	5/16	54 5/16	2½	5/16	2	52½	2¼	5/16	2	120	31
Vim 27–¾	3	5/16	⅞	.....	14½	1½	5/16	4	14½	1½	5/16	4	64	30
Vim 28–½	3	5/16	⅞	.....	14½	1½	5/16	4	14½	1½	5/16	4	83½	30
Vim 25–1	4	5/16	1	.....	19	2	5/16	4	19	2	5/16	4	92	32
Vim 22–2	4	5/16	1	.....	44½	2	5/16	2	44½	2	¼	2	121¼	34
Vim 23–3	5	5/16	1⅛	.....	51½	2¼	5/16	2	51½	2¼	¼	2	159½	34
Walker M½	.....	.....	.....	.....	43	2¼	5/16	2	18	1¾	5/16	4	87	32
Walker K1	.....	.....	.....	.....	46	2½	5/16	2	18	2	5/16	4	96	32
Walker L2	.....	.....	.....	.....	53½	2½	5/16	2	22½	2	5/16	4	120	35
Walker P3½	.....	.....	.....	.....	53½	3	5/16	2	22½	2½	5/16	4	140	35
Walker N5	.....	.....	.....	.....	53½	3	5/16	2	22½	2½	5/16	4	162	35
Walter S–5	3	¼	1¾	.....	15	5	¼	4	57	2½	¼	2	150	36
Ward LaFrance 2B–2½—1920	3	¼	.....	1 5/16	13 3/16	3½	¼	4	13 3/16	3½	¼	4	124	33
Ward LaFrance 4A–3½—1920	3	¼	.....	1½	15⅝	3¾	¼	4	15⅝	3¾	¼	4	169½	37
Ward LaFrance 5A–5—1920	3	¼	.....	1½	17 11/16	4	¼	4	17 11/16	4	¼	4	217½	37
Ward WS	.....	.....	.....	.....	29	1½	5/16	2	15¾	1½	5/16	1	72	37½
Ward WA	.....	.....	.....	.....	16	1¾	5/16	8	16	1¾	5/16	8	95	33 5/16
Ward WB	.....	.....	.....	.....	20	2	5/16	8	20	2	5/16	8	120	33¾
Ward WD	.....	.....	.....	.....	48 7/16	2¼	5/16	4	48 7/16	2¼	¼	4	144	33 7/16
Ward WF	.....	.....	.....	.....	56 7/16	2½	5/16	4	56 7/16	2½	¼	4	168	34 5/16
Ward WH	.....	.....	.....	.....	68¾	3	5/16	4	68¾	3	¼	4	192	37
Wells 2	3	5/16	1¼	¼	54	2½	⅜	2	51	2½	⅜	2	120½	34
White 15–¾	3	.....	1¼	.....	.....	.....	.....	.....	.....	.....	.....	.....	76½	34
White 20–2	3	.....	1¼	.....	.....	.....	.....	.....	.....	.....	.....	.....	107½	34
White 40–3	.....	.....	1¼	.....	.....	.....	.....	.....	.....	.....	.....	.....	157	42
White 45–5	.....	.....	1½	.....	.....	.....	.....	.....	.....	.....	.....	.....	157	42
White Hickory H–1½—1918–20	3	5/16	1	1¼	13½	3½	¼	4	13½	3½	¼	4	116¼	32
White Hickory E–1—1918–20	2	5/16	1¼	1¼	11	3	¼	4	11	3	¼	4	92¼	32½
Whiee Hickory K–2½—1918–20	3	5/16	1	1½	13½	3½	¼	4	13½	3½	¼	4	150	32
Wichita K–1—1915–20	3	5/16	1	1½	19½	2	¼	4	19½	2	¼	4	126½	30
Wichita L–1½—1916–20	3	¼	1	1¾	45	2	¼	2	19	2	¼	2	126½	30
Wichita M–2—1915–20	3	¼	1	1¾	45	2	¼	2	45	2	¼	2	126½	30
Wichita R–2½—1917–20	3	¼	1	1½	51	2¼	¼	2	51	2¼	¼	2	126½	30
Wichita RX–2½—1919–20	4	¼	1¼	1¾	51	2¼	¼	2	51	2¼	¼	2	126½	30
Wichita O–3½—1915–20	4	¼	1¼	1¾	56	2½	¼	2	56	2½	¼	2	152½	36
Wichita S–5—1919–20	4	¼	1½	2	60	3	¼	2	60	3	¼	2	163½	36
Wilcox A–1—1919	3	¼	.....	.....	24 1/16	2½	¼	4	16	2½	¼	4	96	34
Wilcox B–1½—1919	3	¼	.....	.....	24 1/16	2½	¼	4	16	2½	¼	4	132	33
Wilcox C–2½—1919	.....	.....	.....	.....	27½	2½	¼	4	20	2½	¼	4	141	33
Wilcox E–3½—1920	.....	.....	.....	.....	56½	2½	¼	2	56½	2½	¼	2	156	33
Wilcox W–5—1919	3	¼	.....	.....	68½	3	¼	2	68½	3	¼	2	153	38
Wilson 1½—1919–20	3	5/16	.....	1	39½	1¾	5/16	2	39½	1¾	¼	2	120	33
Wilson 2½—1919–20	3	5/16	.....	1¼	13¼	3½	5/16	4	13¼	3½	¼	4	126	33
Wilson 3½—1919–20	3	5/16	.....	1½	16	3¾	5/16	4	16	3¾	¼	4	147	38
Wilson 5—1919–20	3	5/16	.....	1½	18	4	5/16	4	18	4	¼	4	147	38¼
Winther 39–1½	3	¼	1¼	.....	50	2¼	¼	2	22½	2¼	¼	1	120	30
Winther 430–1½	3	¼	1¼	.....	50	2¼	¼	2	22½	2¼	¼	1	120	30
Winther 49–2	3	¼	1¼	.....	52	3	¼	2	50	2¼	¼	2	144	33
Winther 70–3½	3	¼	1¼	.....	62	3	¼	2	60	2½	¼	2	156	33
Winther 109–5	3	¼	1½	.....	93	2¼	¼	2	93	2¼	¼	2	156	33
Winther 140–7	3	¼	1½	.....	93	2¼	¼	2	93	2¼	¼	2	156	33
Witt Will N–1½—1919–20	3	5/16	1¼	1¼	46	3½	¼	4	46	3½	¼	4	102	32
Witt Will P–2—1919–20	3	5/16	1¼	1¼	48	3½	¼	4	48	3½	¼	4	122	32
Wolverine C–1½—1918–20	3	5/16	1	1	41½	2½	5/16	2	41½	1¾	5/16	2	120	34½
Wolverine D–2—1920	3	5/16	1	1	51	3	5/16	2	46	2	5/16	2	132	34½

KEY OF ABBREVIATIONS

Used in the Specifications of Commercial Cars Listed on the Pages Following

In All Specifications { O—Own / Q—Optional

Engine:
Beav—Beaver
Cont—Continental
GBS—Golden, Belknap & Swartz
Her—Hercules
Hink—Hinkley
H-Sp—Herschell-Spillman
Lib—Liberty
LMF—Light Mfg. & Fdy.
Lyco—Lycoming
Rut—Rutenber
Ster—Sterling
Vict—Victory
Wau—Waukesha
Wis—Wisconsin

Valve Arrangement:
I—Overhead
L—ELL-Head
T—TEE-Head
S—Sleeve

How Cooled:
A—Air
C—Centrifugal Pump
G—Gear Pump
P—Water Pump
T—Thermo-Syphon

Radiator (Make or Type):
Bus—Bush
Can—Candler
Chic—Chicago
EM—English-Mersick
Eur—Eureka
Fed—Fedders
Flex—Flexo
GO—G. & O.
Har—Harrison
Hoo—Hooven
Idl—Ideal
Jam—Jamestown
Liv—Livingston
Lng—Long
McC—McCord
May—Mayo
Per—Perfex
R-T—Rome-Turney
Spar—Spartan
Spec—Special
Spi—Spirex
Stan—Standard
C—Cellular
T—Tubular
H—Honeycomb
V—Vertical

Size of Tires:
*—Pneumatic
†—Dual

Lubrication:
B—Force and Splash
C—Centrifugal Pump
F—Force Feed
G—Force and Gravity
P—Pump
S—Splash

Carburetor:
B&B—Ball & Ball
Bent—Bennett
Cart—Carter
Ens—Ensign
Flch—Flechter
Holl—Holley
John—Johnson
King—Kingston
Mar—Marvel
Mas—Master
Mill—Miller
Strm—Stromberg
Shk—Shakespeare
Sheb—Schebler
Till—Tillotson
Zen—Zenith

Fuel Feed:
G—Gravity
P—Pressure
V—Vacuum

Ignition System:
Aer—Aero
AtK—Atwater-Kent
AuL—Auto-Lite
Bat—Battery
Bos—Bosch
Ber—Berling
Con—Connecticut
Del—Delco
Eis—Eisemann
Kin—Kingston
Mag—Magneto
NE—North East
POL—Prest-O-Lite
Sim—Simms
Spl—Splitdorf

Engine Starter:
L—Auto-Lite
B—Bijur
D—Dyneto
G—Gray & Davis
E—Leece-Neville
N—North East
R—Wagner
U—U S L
W—Westinghouse

Clutch:
B—Borg & Beck
C—Cone
D—Disc
E—Detlaff
F—Fuller
G—Detroit Gear & Mach.
H—Hartford
L—Brown-Lipe
M—Merchant & Evans (Hele-Shaw)
U—Muncie
V—Covert
W—Warner

Transmission:
B-Li—Brown-Lipe
Cott—Cotta
Covt—Covert
D-Sea—Driggs-Seabury
Det—Detroit
Dun—Dundore
Durst—Durston
Full—Fuller
G-Lee—Grant Lees
MM—Mechanics Mach. Co.
Munc—Muncie
Plan—Planetary
Rock—Rockford
Selec—Selective
Warn—Warner

Location of Transmission:
A—Amidships
R—Rear
U—Unit with motor
UJ—Unit with jackshaft

Final Drive:
B—Bevel Gear
C—Chain
E—External Spur Gear
F—Friction
I—Internal Gear
N—Concentric Spur
P—Spur
R—Double Reduction
S—Spiral Bevel
W—Worm

Universal:
Acm—Acme
Arv—Arvac
Bld—Blood Brothers
Flex—Flexite
Hart—Hartford
KB—Kinsler-Bennett
Mech—Mechanics
M & E—Merchant & Evans
Pet—Peters
Spic—Spicer
Ster—Sterling
Ther—Thermoid
UM—Universal Machine
UP—Universal Products
Dit—Ditwiler

Rear Axle:
Badg—Badger
Cel—Celfor
Chi—Chicago
Cl—Clark
Emp—Empire
Hind—Hindley
Own D—Dead, Own design
W—Westinghouse
Rock—Rockford
Russ—Russel
Sals—Salisbury
Sav—Savage
Shel—Sheldon
Stan—Stan-Par
Thom—Thomson
Tim—Timken
Torb—Torbensen
W-M—Weston-Mott
Wis—Wisconsin
Flot—Floating
½-Fl—Semi-Floating
¾-Fl—¾ Floating

Springs:
Cham—Champion
Det—Detroit
GC—Garden City
Hig—Higgins
IC—Iron City
Kal—Kalamazoo
Lah—Laher
Mar—Maremont
Math—Mather
Mer—Merrill
Nat—National
Row—Rowland
Per—Perfection
Shel—Sheldon
SP—Spring Perch
Stan—Stan-Par
Ster—Sterling
Tem—Temme
Tut—Tuthill
US—United States
Cant—Cantilever
Elip—Full Elliptic
S-El—Semi-Elliptic
¾-El—¾-Elliptic
S&C—Semi and Cantilever
S&¾—Semi and ¾-Elliptic

Steering Gear:
CAS—C. A. S. Products Co.
Gem—Gemmer
Jac—Jacox
Lav—Lavine
Ross—Ross
W—Worm
Warn—Warner
Wohl—Wohlrab

Governor:
C—Centrifugal
Cont—Continental
Del—Delaney
Dup—Duplex
Hink—Hinkley
Mer—Merrill
McC—McCanna
Mon—Monarch
Pier—Pierce
Rug—Ruggles
Simp—Simplex
Wau—Waukesha

Wheels:
Arc—Archibald
AuW—Auto Wheel
Bim—Bimel
Cla—Clark
Day—Dayton
Det—Detroit
E&O—Eberly & Oris
Hay—Hayes
Hoo—Hoopes Brothers
Jon—Jones
Kel—Kelsey
Mil—Military
Mut—Mutual
Pru—Prudden
Roy—Royer
Rus—Russell
Sal—Salisbury
Sch—Schwartz
Smi—Smith
Sta—Stanwell
StM—St. Mary
Stn—Standard
Wan—Wayne
W&L—Waterhouse & Lester

Rim Equipment:
Bak—Baker
Det—Detroit
Fir—Firestone
Gdy—Goodyear
Jax—Jaxon
Kel—Kelsey
Stn—Stanweld

Commercial Car Specifications—Corrected Monthly

The Specifications, Chassis Prices, Etc., Are Corrected Each Month From Data Supplied Direct by the Makers. GasolineTractor-Trucks and Electric Commercial Cars Will be Found at the End of Gasoline Commercial Cars

See Also Replacement Table in "Service and Repair Departments." Truck Frame Dimensions Are Included in Replacement Table

(All New Models and Changes in Current Models Are in Heavy Type)

(Where prices are not given it is because we have been unable to get them from authoritative sources)

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
800 Pounds																															
Pony	800	....	Own	2¼x4	12.1	L	T	H	B	Strm	G	AtK	...	...	Fric	3	....	Dead	C	Own	4.25:1	12.25:1	Tut	28x3	28x3	Own	92	.....	Pru	.....	60
1000 Pounds																															
Dodge	1990	1085	Own	3¼x4½	24.1	L	C	T	B	Stew	V	Own	N	D	Selec	3	U	Own	S	Flot	4.16:1	19.41:1	S & ¾	33x4	33x4	Own	114	.....	Kel	Kel	41
Ellsworth 25A	2100	....	Lyco	3¼x5	16.9	L	T	T	S	Cart	G	Con	A	C	GLee	3	U	Stan	B	Gem	4.75:1	16:1	Shel	30x3½*	30x3½*	Fos	108	.....	Sal	Det	70
Elmira	....	....	LeRoi	3½x4½	15.6	L	T	H	B	Holl	...	Opt	...	A	Own	3	....	Ther	B	½-Fl	3.6:1	.....	Own	28x3½*	28x3½*	Own	104	.....	.....	.....	65
Vim 27	2120	1095	Own	3 x4½	14.4	L	T	McC	B	Zen	G	AtK	...	C	Selec	3	U	Spic	W	Shel	5.5:1	.....	Shel	31x4	31x4*	C.A.S.	108	.....	Hoo	Fir	....
Vim 28	2250	1350	Own	3 x4½	14.4	L	T	McC	B	Zen	G	AtK	...	C	Selec	3	U	Spic	W	Shel	5.5:1	.....	Shel	32x4½*	22x4½*	C.A.S.	127	.....	Hoo	Fir	....
1500 Pounds																															
Atlas 20	2320	....	Lyco	3½x5	19.6	L	T	H	S	Sheb	...	AtK	R	B	Selec	3	....	Arv	B	Hess	.....	.....	Row	32x4½*	32x4½*	CAS	118	.....	.....	.....	60
Bethlehem K	2660	1595	Own	3½x5	19.6	L	T	Liv	F	Zen	G	Bos	G	B	Det	3	U	Spic	B	Stan	58.8:1	16.4:1	Math	34x1½	35x5	Ross	125	.....	Wan	Fir	65
Dispatch G	2200	....	Wis	3¼x5	22.5	L	T	C	F	Rayf	V	Bos	U	O	Own	4	A	Bld	C	Dead	4.12:1	15:1	Tut	34x4*	34x4*	W	120	.....	.....	.....	50
G.M.C. 16	2940	....	Cont	3¼x5	22.5	L	C	McC	S	Mar	G	Eis	...	D	Selec	3	U	UM	B	WM	6:1	21.9:1	Det	35x5*	35x5*	Jac	132	Mon	.....	Bak	67
H. R. L., L	.....	....	H-Sp	3½x5	19.6	...	T	Fed	F	Zen	...	Bos	...	D	Covt	3	....	Spic	W	Wis	.....	.....	Shel	34x4½*	35x5*	Ross	134	.....	Sch	.....	....
International H	2800	1750	Own	3½x5¼	19.6	L	C	Own	B	Holl	G	Bos	O	D	Own	3	A	Own	I	Own	7:1	25:1	.....	36x3	36x3½	Own	115	Own	Own	Fir	50
Kearns ¾	2000	1550	LMF	3½x4½	16.9	...	T	Own	...	Zen	...	Ber	D	B	G-Lee	3	U	M&E	...	Torb	.....	.....	S-El	32x4½	32x4½	Lav	118	Mon	.....	.....	70
Marshall	.....	....	Lyco	3¼x5	16.9	...	T	C	...	.....	...	.....	...	H	Selec	3	U	.....	...	Flot	.....	.....	Cant	30x3½	30x3½	W	112	.....	.....	Fir	....
Oldsmobile	2324	1350	Own	3 11/16x5¼	21.7	I	C	Own	B	Zen	V	AuL	L	C	Selec	3	U	Hart	I	Torb	6.5:1	38.87:1	S-El	35x5	35x5	Jac	128	.....	AuW	Jax	73
Rainier R11	2350	1850	Cont	3½x5	19.6	L	T	Har	...	Zen	V	Sim	..	D	B-Li	3	....	Hart	W	Timk	7.2:1	23.9:1	Per	34x4½	34x4½	Lav	125	Mon	Sch	Fir	80
Reo F	2560	1385	Own	4 ½x4½	27.2	L	C	Own	S	John	G	Rem	R	O	Own	3	A	Own	B	Own	4.6:1	17.2:1	Penn	34x4½*	34x4½*	Own	128	.....	Pru	Fir	62.5
Shaw M-2	2400	1975	Cont	3¼x5	22.5	L	T	T	B	Zen	G	Bos	...	L	B-Li	3	U	Spic	B	Timk	4.9:1	16.31:1	Math	32x4*	32x4*	Gem	116	.....	Stn	Fir	65
Stewart 11	2190	1350	LeRoi	3½x4½	15.6	L	T	T	B	Zen	G	Eis	D	B	Durst	3	U	Hart	I	Cl	6.6:1	18.06:1	Det	32x4	32x4	CAS	110	.....	Wan	Fir	66.7
Texan	2500	1495	Lyco	3½x5	19.6	L	T	H	B	Cart	V	Con	B	B	GLee	3	U	UP	B	Flot	4.25:1	18.6	Cant	33x4	33x4	CAS	112	.....	Stn	Fir	60
Triangle AA	2500	1600	Her	3¼x5	16.9	L	T	Per	S	Strm	G	NE	N	F	Full	3	U	UP	I	Cl	6:1	18:1	Det	35x5*	35x5*	Gem	115	.....	Hay	Fir	60
White 15	2960	2400	Own	3¾x5 ½	22.5	L	C	C	B	Own	G	Mag	...	D	Selec	4	A	Own	B	Own	.....	.....	.....	34x4½*	34x4½*	Own	133	.....	.....	Fir	70
1 Ton																															
Acason B	3650	2400	Wau	3¼x5¼	22.5	L	P	Can	S	Mar	V	Eis	...	F	Full	3	U	Bld	W	Timk	8.25:1	33:1	Det	36x3½	36x5	Ross	142	Wau	Bim	Opt	....
Acme B	3376	2175	Cont	3¾x5	22.5	L	T	GO	B	Rayf	V	Eis	G	B	Cott	3	U	Bld	W	Timk	7.75:1	31:1	Det	34x3½	34x5	Ross	130	Dup	Bim	.....	80
All-American A	2600	1795	H-Sp	3½x5	19.6	L	T	Stan	B	Strm	G	Sim	...	E	Cott	3	....	Hart	I	Torb	8:1	18:1	Det	33x4*	32x4	Lav	130	Pier	Stn	Gyd	75
Apex C	2870	1495	Buda	3½x5½	22.5	L	T	G&O	P	Strm	V	AuL	Q	F	Full	3	U	UP	I	Torb	6.5:1	19.5:1	Det	33x4*	32x3½	Lav	130	.....	.....	Fir	70
Beck-Hawkeye A	2800	1950	Cont	3¾x5	22.5	L	T	Har	S	Strm	G	Bos	...	F	Full	3	....	Bld	I	Cl	6:1	2.5:1	Hig	34x3½	34x5	Lav	124	Pier	Hay	Fir	75
Belmont A	2000	....	GBS	3¾x4¼	22.5	L	T	GO	S	Zen	G	Con	D	P	Selec	3	U	Ster	B	¾-Fl	5.25:1	15.75:1	S-El	31x4*	31x4*	Lav	113	.....	E&O	Stn	60
Bessemer G	2910	....	Cont	3½x5	19.6	L	T	C	B	Strm	G	Bos	...	F	Full	3	U	Arv	I	Torb	7:1	20.25:1	Per	34x3½	34x4	Ross	124	.....	Sch	Fir	57
Birch 1	.....	1595	.....	3½x5	19.6	...	T	.....	B	Strm	...	Con	...	...	Full	3	....	UM	...	Cl	.....	.....	.....	32x3½	32x4	Lav	132	.....	.....	.....	....
Capitol B	.....	....	Wis	4¼x5	22.5	...	T	T	...	Zen	...	Bos	B	E	Cott	4	....	Ther	W	Wis	8.25:1	.....	SP	36x6	36x6	Ross	134	Pier	.....	.....	85
Chevrolet T	2840	1325	Own	3 11/16x5¼	21.7	I	C	Har	B	Zen	...	Rem	L	C	Warn	3	...	Arv	W	½-Fl	.....	.....	Hess	33x4*	35x5*	Warn	125	Mon	.....	.....	....
Clydesdale 32X	3400	2185	Cont	3¾x5	22.5	L	T	T	S	Zen	G	Bos	...	L	B-Li	3	U	Spic	W	Stan	7.5:1	24:1	Stan	34x3½	34x5	Ross	144	Own	.....	.....	72
Collier 18	.....	.....	Cont	.....	19.6	...	...	.....	S	.....	...	.....	...	F	Full	...	....	.....	W	Own	.....	.....	.....	34x4	34x5	Ross	140	Mon	.....	.....	....
Columbia F	3000	1850	Cont	3¾x5	22.5	L	C	T	B	Strm	G	Dix	...	B	Covt	3	U	Spic	I	Russ	7.5:1	21:1	Per	34x3½	34x5	Own	125	Pier	StM	Fir	70
Commerce E	2900	1855	Cont	3¾x5	22.5	L	T	L	S	Zen	V	Eis	I	C	Selec	3	U	Spic	I	Torb	7:1	22.9:1	Det	35x5	35x5	Jac	126	.....	Bim	Fir	80
Conestoga 20	3300	....	Cont	3½x5	19.6	L	T	EM	S	Strm	G	Sim	...	F	Full	3	U	Ster	W	Wis	7.75:1	23:1	S-El	34x3½	34x5	Ross	128	.....	E&O	Stn	90
Corbitt E	3250	2400	Cont	3¾x5	22.5	L	T	McC	B	Strm	V	Eis	...	D	B-Li	3	U	Hart	W	Shel	6.5:1	19.5:1	Shel	34x3½	34x4	Ross	130	Simp	Bim	Fir	75
Dart H	3200	2100	Buda	3¾x5½	22.5	L	T	C	F	Zen	V	Eis	...	F	Full	3	U	Spic	W	Own	7:1	20.3:1	Per	34x3½	34x5	Ross	130	Pier	Pru	.....	80
Day-Elder A	3250	2100	Cont	3¾x5	22.5	L	T	Bus	B	Zen	G	Eis	...	V	Covt	3	U	Hart	W	Shel	7.75:1	28.3:1	IC	34x3½	34x4	Gem	128	.....	Jon	Fir	70
Denby 12	3100	2150	Cont	3¾x5	22.5	L	T	Lng	B	Strm	G	Eis	...	F	Full	3	U	UP	I	Russ	6.8:1	21.8:1	Det	35x5	36x6	Ross	124	.....	Hay	.....	73
Diehl A	2400	....	Cont	3½x5	19.6	...	T	H	B	Zen	G	Sim	...	B	Durst	3	....	K-B	1	Torb	5.33:1	3.5:1	Mar	34x4½*	35x5*	Jac	115	.....	Sch	Fir	90

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1½ Ton—Continued

1½ Ton—Continued

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Tranamission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
Famous B-12	3600	2295	Cont	3¾x5	22.5	L	T	T	S	Strm	V	Eis	...	F	Full	3	U	Bear	1	Cl	7:1	21:1	Det	36x3½	36x5	Ross	138	Mon	Bim	.....	75
Federal TE	4050	2600	Cont	4¼x5¼	27.2	L	C	T	B	Zen	G	Eis	...	B	Own	4	A	Spic	W	Timk	8.5:1	37.4:1	Math	36x3½	36x5	Gem	144	Phar	Sch	Fir	68.5
Forschler A-X	3670	2375	Cont	3½x5	19.6	L	C	Own	B	Zen	...	Bos	Q	F	Full	3	....	Hart	W	Shel	.....	.....	Own	36x3½	36x5	Ross	120	Dup	Smi	.....	....
Front-Drive C	.....	.....	Buda	3¼x5¼	22.5	L	P	T	S	Strm	...	Bos	...	...	Own	3	....	Own	W	Dead	8:1	.....	Elip	34x6	34x6	Lav	Q	Pier	.....	.....	55
Gary GT	3800	2550	Buda	4 x5½	25.6	...	C	T	F	Mas	G	Eis	...	F	Full	3	U	Bld	W	Timk	7.25:1	21.75:1	Det	36x3½	36x5	Ross	144	McC	Pru	Gdy	....
Gersix M	4300	3100	Buda	4 x5½	25.6	L	C	T	F	Strm	V	Bos	...	B	Cott	2	U	Bld	W	Own	7.75:1	31:1	Tut	36x3½	36x6	Ross	142	Mon	Jon	.....	70
G.M.C. 31A	4205	....	Cont	3¾x5	22.5	L	C	McC	P	Mar	G	Eis	...	D	Selec	4	U	Own	W	Timk	9.25:1	37.5:1	Det	36x3½†	36x5	Jac	130	Mon	Own	SAE	74
G.M.C. 31B	4245	....	Cont	3¾x5	22.5	L	C	McC	P	Mar	G	Eis	...	D	Selec	4	U	Own	W	Timk	9.25:1	37.5:1	Det	36x3½†	36x5	Jac	144	Mon	Own	SAE	74
Graham Br's. Speed Truck	2950	2295	Cont	3¾x5	22.5	L	T	Lng	B	Strm	G	Eis	Q	F	Full	3	....	K-B	I	Torb	7:1	28:1	S-El	35x5*	36x6*	Lav	133	Mon	.....	.....	80
Gramm-Bernstein 15	3950	2095	Cont	3¾x5	22.5	L	T	T	S	Strm	G	NE	...	D	Selec	3	U	Own	I	Cl	7.6:1	20.6:1	S-El	36x3½	36x5	Ross	138	.....	Bim	Fir	90.5
Gramm-Bernstein 65	4200	2775	Cont	3¾x5	22.5	L	T	T	S	Strm	G	NE	...	D	Own	3	U	Own	W	Stan	7.8:1	28:1	S:El	36x3½	36x5	Ross	138	.....	Bim	Fir	90.5
Grant 17A	3500	....	Cont	3¾x5	22.5	L	T	Fed	B	Spec	V	Dix	R	L	B-Li	4	U	.....	I	Torb	5.5:1	22.9:1	Per	35x5	38x7	Jac	140	Pier	Bim	Fir	67
Hahn CD	4800	.....	.....	4½x5	27.2	L	C	Own	F	Strm	G	Bos	...	D	B-Li	3	....	Spic	W	Timk	6:1	.....	.....	36x3½	36x6	Ross	130	Pier	.....	.....	65
Harvey WEA	3850	2550	Buda	4½x5½	27.2	L	P	T	F	Zen	G	Bos	...	F	Full	3	U	Arv	W	Shel	7.75:1	23.25:1	Shel	34x3½	34x5	Ross	128	Mon	StM	.....	80
Hawkeye K	3750	....	Buda	3¾x5½	22.5	L	P	C	B	Zen	G	Eis	...	F	Full	3	U	Hart	I	Cl	7.6:1	30.4:1	Det	34x3½	34x5	Ross	148	Simp	Bim	Fir	70
Higrade B 20	3300	2500	Cont	4½x5¼	27.2	L	P	Per	B	Zen	V	Eis	L	F	Full	3	U	Bld	W	Shel	7.75:1	31:1	Per	36x6	36x6	Lav	130	.....	Det	Fir	66
Hoover 20A	3150	....	Cont	3½x5	19.6	L	P	Can	F	Sheb	V	Dix	...	F	Full	3	U	Arv	W	Shel	7.8:1	23.4:1	Shel	36x4	34x5	Lav	132	Pier	E&O	Fir	....
H. R. L., R	.....	.....	Hink	.....	.....	...	C	Fed	F	Zen	...	Bos	...	L	B-Li	4	.....	.....	W	Shel	.....	.....	Shel	36x4	36x6	Ross	144	.....	Sch	.....	....
Huffman B	3200	1895	Cont	3¾x5	22.5	...	T	C	F	Zen	G	Dix	I	F	Full	3	U	.....	W	Stan	8.67:1	8:1	Per	34x3½	34x6	Lav	140	.....	Roy	Fir	85
Huffman C	3350	1695	Buda	3¾x5½	22.5	...	T	C	F	Zen	G	Dix	I	F	Full	3	U	.....	W	Torb	12.17:1	11.5:1	Per	34x3½	34x6	Lav	140	.....	Roy	Fir	85
Hurlburt	4300	2850	Buda	4 x5½	25.6	L	C	Own	B	Flch	G	Eis	...	M	B-Li	3	.....	.....	W	Hind	.....	.....	Per	34x4	34x5	Ross	148	Dup	Wan	.....	85
Indepen't E, Dav'n't, Ia	3550	....	Cont	3¾x5	22.5	L	C	C	B	Strm	V	Bos	...	F	Full	3	U	Bld	C	Russ	8.2:1	.....	GC	35x5*	38x7*	Lav	135	.....	StM	Fir	75
International K	3400	2300	Own	3½x5¼	19.6	L	P	Own	B	Holl	G	Bos	O	D	Own	3	A	Own	I	Own	9:1	30:1	.....	36x3½	36x5	Own	128	Own	Own	Fir	50
Jumbo 15	3600	2850	Buda	3¾x5¼	22.5	L	P	Own	F	Zen	G	N E	N	F	Full	3	U	Arv	I	Cl	7.2:1	4:1	Per	36x3½	36x5	Jac	144	.....	.....	.....	75
Kalamazoo G	5080	....	Cont	3¾x5	22.5	L	P	G&O	F	Strm	V	Bos	D	F	Full	4	A	Acme	W	Wis	8.25:1	41:1	Shel	34x4	36x5	Ross	144	Pier	Bim	.....	80
Kearns 1½	3400	2100	H-Sp	3½x5	19.6	...	T	Own	S	Zen	...	Ber	D	B	GLee	3	U	M&E	...	Torb	.....	.....	S-El	34x3½	34x6	Lav	136	Pier	.....	.....	70
Kelly-Springfield K31	4590	3000	Own	3¾x5¼	22.5	L	C	Fed	F	Zen	G	Eis	W	C	Covt	3	A	Own	C	Dead	8.66:1	31.58:1	Per	36x3½	36x6	Gem	144	Pier	StM	.....	89
Kelly-Springfield K32	4685	3000	Own	3¾x5¼	22.5	L	C	Fed	F	Zen	G	Eis	W	C	Covt	3	A	Spic	W	¼-Fl	8.66:1	31.58:1	Per	36x3½	36x6	Gem	144	Pier	StM	.....	89
Kissel General Utility	3890	2475	Own	3½x5½	24.1	L	C	McC	S	Strm	V	Eis	...	W	Warn	3	U	Spic	W	Shel	7.8:1	28.5:1	Math	36x3½	36x5	Jac	152	Pier	Pru	.....	69
Kleiber A	.....	....	Cont	4½x5¼	27.2	...	...	.....	...	Strm	G	Bos	...	...	B-Li	...	A	.....	W	.....	7.75:1	33:1	.....	36x3½	36x6	Ross	143	.....	W&L	.....	....
Larrabee-Deyo U	3600	....	Cont	3¾x5	22.5	L	C	Bus	S	Sheb	G	Bos	...	L	B-Li	3	U	Spic	W	Timk	7:1	23.52:1	Mer	36x4	36x6	Ross	150	Pier	Sch	Gdy	70
Maccar L 1½	4300	2925	Cont	4½x5¼	27.2	L	C	Own	B	Strm	G	Eis	...	L	B-Li	3	U	Spic	W	Timk	7:1	23.52:1	Mer	36x4	36x3½††	Gem	Q	Own	Sch	.....	68
Mack AB	4800	3000	Own	4 x5	25.6	L	C	Own	S	Zen	G	Aer	...	L	B-Li	4	U	Bld	C	Own D	6.99:1	28.01:1	Mer	36x4	36x3½††	Gem	Q	Own	Sch	.....	68
Mack AB	4900	3000	Own	4 x5	25.6	L	C	Own	S	Zen	G	Aer	...	L	B-Li	4	U	Spic	W	Timk	8.5	34.09:1	Mer	36x4	36x3½††	Gem	Q	Own	Sch	.....	68
Master AB	3800	2390	Buda	4½x5½	27.2	L	C	T	S	Mas	G	Eis	...	D	Full	3	U	Spic	W	Timk	7.75:1	23.25:1	Det	34x3½	34x5	Ross	142	McC	Pru	.....	78
Master JW	3900	2490	Buda	4½x5½	27.2	L	C	T	S	Mas	G	Eis	...	D	Full	3	U	Spic	I	Torb	8:1	24:1	Det	34x3½	34x5	Ross	142	McC	Pru	.....	78
Maxwell	2385	1322	Own	3½x4½	21	L	C	T	S	.....	G	AtK	...	C	Selec	3	U	Own	W	Wis	8.33:1	30.65:1	Tut	36x3½	36x5	Ross	144	Mon	Stn	Fir	80
Menominee H	4150	2725	Wis	4 x5	25.6	L	C	C	S	Strm	G	Eis	...	E	Cott	3	U	Spic	W	Wis	8:1	24:1	Tut	36x3½	36x5	Ross	126	.....	Smi	SAE	....
Moreland 20B	4150	....	Cont	4½x5¼	27.2	L	C	Own	B	Mill	G	Dix	...	D	Selec	4	A	Ther	W	Timk	7:1	33.88:1	US	36x3½	36x5	Ross	126	.....	Smi	SAE	....
Napoleon 11	3450	1660	Vict	3½x5	19.6	I	C	T	S	Strm	G	Con	L	F	Full	3	U	UP	I	Cl	8:1	24:1	S-El	35x5*	36x6*	Lav	133	.....	.....	Fir	65
Nelson & LeMoon F1½	3400	....	Cont	4½x5¼	27.2	L	C	T	S	Strm	G	Bos	W	L	B-Li	3	U	Own	W	Timk	7:1	2:1	Tut	36x3½	36x6	Lav	...	Pier	Pru	Gdy	80
Noble B-30	4200	....	Buda	3¾x5¼	22.5	L	C	T	F	Strm	G	Eis	W	F	Full	3	U	M&E	W	Shel	7.75:1	31.1:1	S-El	36x3½	36x5	Lav	156	Pier	Bim	Fir	85
Norwalk	1850	2025	Lyco	3½x5	19.6	L	C	C	B	Zen	V	Bos	D	B	GLee	3	...	UM	W	Stan	.....	.....	C-C	34x3½	34x5	CAS	143	.....	.....	.....	....
O.K. 1½ T	.....	2450	Buda	4½x5½	27.2	L	P	K-T	B	Zen	V	Eis	...	F	Full	3	U	Hart	W	Wis	.....	.....	Tut	36x3½	36x5	Ross	146	Pier	.....	.....	....
Old Reliable A	4150	2350	Wis	4 x5	25.6	L	C	T	B	Strm	V	Bos	Q	M	B-Li	3	U	Spic	W	Shel	7.75:1	24.94:1	Shel	34x3½	36x6	Ross	138	Mon	StM	.....	90
Oneida B9	5025	2915	Own	4 x5¼	25.6	L	C	Own	P	Strm	...	Mag	...	D	Own	3	A	Own	W	Own	8.25:1	33:1	S-El	36x3½	36x6	W	144	Own	.....	.....	46.2
Packard B. E	4640	3200	Own	4 x5½	25.6	L	C	T	F	Own	P	Dix	B	D	Selec	4	A	Spic	W	Flot	6.25	28.7	.....	34x3½	34x3½††	Own	144	Own	.....	.....	....
Paige 52-19	4000	2680	Hink	4 x5¼	25.6	L	C	T	F	Strm	V	Bos	Q	L	B-Li	4	A	Spic	W	Timk	7.75:1	37.51:1	Per	34x3½	34x5	Ross	140	Hink	.....	Fir	85
Pioneer N, Detroit, Mich	3600	....	Cont	3¾x5	22.5	L	C	T	B	Strm	V	Eis	...	L	B-Li	3	A	Spic	W	Timk	8.5:1	28.3:1	Per	36x3½	36x5	Gem	154	Mon	.....	Fir	....
Rainier R-6	3100	2150	Cont	3½x5	19.6	L	C	Har	B	Zen	V	Sim	...	D	B-Li	3	U	Hart	W	Shel	7.8:1	25.97:1	Per	34x3	34x5	Lav	133	Mon	Sch	.....	80
Reliance A10	4500	2500	Buda	4 x5½	25.6	L	C	T	B	Strm	G	Eis	...	F	Full	3	U	Peters	E	Badg	6.6:1	19.8:1	Shel	36x3½	36x5	Ross	150	Pier	Bim	Gdy	90
Republic 11X	3365	2195	Cont	3¾x5	22.5	L	C	C	B	Strm	G	Bos	...	D	Full	3	U	Hart	I	Torb	8:1	23:1	S-El	34x4	34x6	Jac	144	Rug	Pru	Fir	....
Reynolds 3A	.....	.....	Hink	4x5¼	25.6	L	C	Lng	F	Strm	G	Bos	W	V	Covt	4	A	Snead	W	Shel	6.5:1	30.62:1	S-El	36x3½	36x6	Lav	144	Hink	Smi	.....	80
Rowe CW	2800	2800	Wis	3¾x5	22.5	L	C	Fed	F	Zen	G	Bos	...	L	B-Li	4	U	Spic	W	Shel	6.5:1	26:1	Shel	36x6*	36x6*	Ross	133	Simp	Hoo	.....	....
Royal	.....	.....	Wis	3¾x5	22.5	...	C	T	...	Strm	...	Bos	Q	D	Own	...	...	Own	W	Timk	.....	.....	Mer	34x4	34x5	Ross	128	.....	.....	.....	67
Sandow CG	3300	2590	Cont	3¾x5	22.5	L	C	T	B	Strm	G	Eis	...	D	Full	3	U	Spic	W	Shel	7.8:1	23:1	GC	34x3½	34x5	Ross	135	.....	Stn	.....	70
Schwartz BI	3750	2385	Cont	3¾x5	22.5	L	T	Fed	B	Strm	G	Bos	...	L	B-Li	3	U	M&E	I	Torb	8:1	26.9:1	Row	34x3½*	34x5*	Ross	140	Mon	Sch	Fir	....
Schwartz BW	4000	2500	Buda	3¾x5¼	22.5	L	T	Fed	B	Strm	G	Bos	...	M	Dun	3	U	M&E	W	Thom	8:1	26.9:1	Row	36x6*	34x5*	Ross	140	Mon	Sch	Fir	....
Selden 1½A	3400	2460	Cont	3¾x5	22.5	L	C	Lng	B	Strm	G	Eis	...	L	B-Li	3	U	Spic	W	Timk	7:1	23.31:1	Per	34x3½	34x5	Lav	137	Pier	Arc	.....	70
Service 31	4850	2985	Buda	4 x5½	25.6	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	7:1	33.8:1	.....	35x5*	38x7*	Ross	150	Simp	Bim	.....	65
Service 36	4900	3415	Buda	4½x5½	28.9	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	9.25:1	37:1	Det	34x4	36x6	Ross	144	Pier	Hay	Gdy	75
Signal H	4670	2925	Cont	4½x5¼	27.2	L	C	McC	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	.....	.....	Det	35x3½	35x5	Ross	144	.....	.....	.....	70
Southern 15	.....	.....	Buda	3½x5½	19.6	L	C	T	S	Zen	...	Bos	...	F	Full	3	.....	.....	W	Shel	.....	.....	Det	36x3½	36x5	Ross	142	Wau	Pru	.....	91
Sterling 1½	4720	3200	Ster	4 x5¼	25.6	L	C	Own	P	Ray	V	Eis	...	L	B-Li	4	U	Spic	W	Timk	7.7:1	28:1	Math	36x3½	36x5	Gem	140	.....	Wan	Fir	70
Stewart 9	3440	2250	Cont	3¾x5	22.5	L	C	T	B	Zen	G	Eis	...	F	Full	3	U	Hart	I	Cl	7.6:1	22.8:1	Det	34x3½	34x5†	Gem	140	.....	Wan	Fir	70
Stoughton B	.....	.....	.....	3¾x5½	22.5	L	C	Own	F	Strm	G	Eis	...	D	B-Li	3	U	Ther	W	Shel	7.8:1	31.2:1	S-El	36x3½	36x5	Lav	140	.....	Own	Gdy	....
Sullivan F	3500	2350	Buda	3¾x4½	22.5	L	C	V	B	Strm	G	Bos	...	H	Covt	3	A	Hart	W	Timk	8.5:1	31:1	Mer	36x3½	36x5	Ross	129	.....	Wan	.....	60
Texan TK39	3200	....	Lyco	3½x5	19.6	L	C	H	B	Cart	V	Con	B	B	G-Lee	3	U	UP	W	¼-Fl	7.75:1	20 15:1	S-El	34x4	34x4	CAS	130	.....	Bim	Fir	60
Tiffin GW	3750	2530	Cont	4½x5½	27.2	L	C	V	B	Sheb	G	Bos	...	F	Full	3	U	Hart	W	Shel	7.75:1	23.25:1	Kal	36x3½	36x5	Ross	129	Pier	Smi	.....	....
Tower J1½	3900	....	Cont	4½x5¼	27.2	L	C	T	S	Strm	...	Bos	...	F	Full	3	....	Spic	W	Timk	.....	.....	Det	35x5*	38x7*	Ross	142	Pier	.....	.....	70
Transport 30	3450	2250	Cont	3¾x5	22.5	L	C	C	B	Strm	G	Eis	...	F	Full	3	U	Hart	I	Cl	7.6:1	30.4:1	Det	36x3½	36x5	Jac	140	Simp	.....	Fir	70
Traylor C	4700	....	Buda	4x5¼	25.6	L	P	G&O	F	Zen	...	Spl	...	V	Covt	3	....	Hart	W	Shel	7.75:1	.....	Mer	36x4	36x6	Ross	138	Pier	.....	.....	78
Triangle A	3750	2185	Wau	3¾x5¼	22.5	L	C	Per	S	Strm	G	Eis	...	F	Full	3	U	UP	I	Cl	6.83:1	21:1	Det	34x3½	34x6	Gem	144	Wau	Roy	Fir	60
Triumph H	4000	2450	Buda	3¾x5¼	22.5	L	C	H	F	King	V	Dix	...	B	Cott	3	U	UP	...	Russ	.....	8:1	S-El	36x3½	36x6	Lav	144	Pier	Stn	Stn	70
Ultimate A	4500	....	Buda	4x5½	25.6	L	C	Bus	F	Strm	...	Eis	W	L	B-Li	4	.....	Spic	W	Shel	6.5:1	.....	Shel	36x3½	36x4	Ross	140	Pier	.....	.....	72

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Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrang't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
2 Ton—Continued																															
Sandow I.	3800	2775	Cont	3¾x5	22.5	L	P	T	B	Strm	G	Eis	...	D	Full	3	U	Spic	I	Torb	10:1	30:1	GC	36x4	36x6	Ross	150	.....	Stn	.....	70
Schacht	5500	....	Buda	4¼x5½	28.9	L	P	Own	F	Sheb	G	Bos	...	O	Own	3	A	Flex	W	Own	.....	.....	Nat	36x4	36x7	Own	144	Dup	StM	.....	70
Signal J	5010	3275	Cont	4⅛x5¼	27.2	L	C	McC	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	9.25:1	37:1	Det	34x4	36x8	Ross	150	Pier	Hay	Gdy	80
Southern 20	.....	2890	Buda	3¾x5	22.5	L	T	T	S	Zen	...	Bos	...	F	Full	4	.....	.....	W	Shel	.....	.....	Det	34x4	34x6	Ross	160	.....	.....	.....	70
Sterling 2	5000	3500	Ster	4 x5¾	25.6	L	C	Own	P	Rayf	V	Eis	...	L	B-Li	4	U	Spic	W	Timk	7.7:1	37.26:1	Math	36x4	36x6	Ross	142	Wau	Pru	.....	91
Stewart 7	4460	2875	Cont	4½x5¼	27.2	L	P	T	B	Zen	G	Eis	...	F	Full	3	U	Hart	I	Cl	9:1	27:1	Det	34x4	34x7†	Ross	156	Pier	Wan	Fir	72
Stoughton D	.....	.....	.....	4 x5½	25.6	L	C	Own	C	Strm	G	Eis	...	D	B-Li	3	U	Ther	W	Shel	8.75:1	35:1	S-El	36x4	36x7	Lav	140	Dup	Own	Gdy	....
Sullivan E	4500	3350	Buda	4¼x5½	28.9	L	P	V	F	Strm	V	Bos	...	L	B-Li	3	U	Spic	W	Timk	7.75:1	26:1	Shel	36x4	36x7	Ross	150	.....	Wan	.....	71
Sullivan EL	4500	3375	Buda	4¼x5½	28.9	L	P	V	F	Strm	V	Bos	...	L	B-Li	3	U	Spic	W	Timk	7.75:1	26:1	Shel	36x4	36x7	Ross	168	.....	.....	.....	71
Superior E	3600	2600	Cont	4½x5¼	27.2	L	P	Idl	G	Strm	V	Eis	...	F	Full	3	U	Arv	I	Torb	9:1	23.2:1	Tut	36x4	36x6	Ross	144	Pier	Sch	Fir	75
Traffic	3175	1495	Cont	3¾x5	22.5	L	T	C	B	Cart	G	Bos	...	C	Covt	3	U	Ther	I	Russ	8.2:1	30:1	Det	34x3½	34x5	Own	132	.....	Roy	Fir	85
Triangle C	4200	2585	Wau	3¾x5¼	22.5	L	C	Per	S	Strm	G	Eis	...	F	Full	3	U	UP	I	Cl	8:1	24:1	Det	36x4	36x6	Gem	146	Wau	Roy	Fir	60
Triumph 2	4900	2750	Buda	4¼x5½	22.5	...	C	H	S	King	V	Dix	...	B	Cott	3	U	UP	I	Russ	.....	8:1	S-El	36x4	36x3½†	Lav	144	Pier	Stn	Stn	70
Twin City 2	4800	.....	Buda	4x5½	25.6	L	C	Spl	F	Strm	V	Bos	...	F	Full	3	U	Arv	I	Cl	8:1	32:1	Math	36x4	36x7	Ross	156	Simp	Bim	.....	80
Vim 22	4700	3150	Her	3¾x5½	22.5	L	G	McC	F	Zen	G	Dix	...	L	B-Li	4	U	Spic	W	Shel	7.75:1	.....	Shel	36x4	36x6	Gem	142	Dup	Smi	.....	....
Wells C-I	4400	2800	Wel	4½x5¼	27.2	L	G	T	B	Stm	...	Ber	D	D	Cott	4	A	Acme	I	.....	7:1	40:1	.....	36x4	36x8	Lav	168	Mon	Smi	Stn	82
White 20	4150	3300	Own	3¾x5½	22.5	L	C	C	B	Own	G	Mag	...	D	Selec	4	A	Own	R	Own	.....	.....	.....	36x4	36x7	Own	157	.....	.....	Fir	70
Wichita M	4700	2800	Wau	3¾x5¼	22.5	L	P	Per	C	Strm	G	.....	...	C	Cott	3	A	Own	W	Shel	10.66:1	55.45:1	S-El	36x3½	36x6	Ross	144	Wau	Bim	Fir	80
Winther 49	5300	3250	Wis	4 x5	25.6	L	P	T	G	Mas	V	Eis	B	B	B-Li	4	A	Bld	I	Cl	9:1	39	Math	34x4	34x4	Ross	150	.....	Own	.....	80
Witt-Will P	4550	3150	Cont	4½x5¼	27.2	I	G	C	B	Zen	G	Eis	...	D	Selec	3	U	Spic	W	Timk	7.75:1	3.36:1	S-El	36x3½	36x7	Ross	144	Pier	Arc	SAE	70
2½ Ton																															
Ace 2½	5630	4250	Buda	4¼x5½	28.9	L	C	Spi	F	Sheb	G	AtK	W	L	Cott	4	A	Spic	W	Opt	7.75:1	34:1	Math	36x6*	40x8*	Ross	156	Pier	Day	Gdy	80
All American 2½	.....	2395	.....	3½x5	19.6	L	T	C	B	Strm	...	Sim	...	E	Cott	3	....	Hart	I	Flot	9:1	.....	Per	34x4	34x6	Lav	Opt	.....	.....	.....	..
Apex E	4500	2450	Buda	4¼x5½	28.9	L	C	G&O	P	Strm	V	Eis	Q	F	Full	3	U	UP	I	Torb	9:1	27:1	Det	36x4	36x6	Lav	150	Dup	.....	Fir	70
Armleder HW	4650		Buda	4¼x5½	28.9	L	C	T	F	Zen	G	Bos	...	D	Full	4	U	Spic	W	Own	9:1	43:1	Math	36x4	36x7	Ross	166	.....	StM	.....	80
Atterbury 7CX-LWB	5280	3475	Cont	4½x5¼	27.2	L	C	T	S	Zen	G	Ber	...	L	B-Li	4	U	Spic	W	Timk	9.25:1	37:1	SP	36x4	36x4†	Gem	171	Mon	Arc	Fir	92.5
Atterbury 7CX-STD	5120	3375	Cont	4½x5¼	27.2	L	C	T	S	Zen	G	Ber	...	L	B-Li	4	U	Spic	W	Timk	9.25:1	37:1	SP	36x4	36x4†	Gem	153	Mon	Arc	Fir	92.5
Available H2½	4750	3250	Cont	4½x5¼	27.2	L	C	Chic	B	Strm	V	Bos	...	L	B-Li	4	A	Spic	W	Timk	8.66:1	34.66:1	S-El	36x4	36x8	Ross	152	Pier	Sch	.....	90
Bell O	4200	2750	Buda	4¼x5½	28.9	...	C	Chic	F	Strm	V	Eis	...	B	Det	3	....	UP	Q	Russ	Opt	.....	Det	34x5	34x7	Gem	146	Dup	.....	.....	65
Bessemer J-2	4600	.....	Cont	4½x5¼	27.2	L	C	C	B	Strm	G	Bos	...	B	B-Li	4	A	Arv	I	Torb	8:1	32:1	Per	36x4	36x4†	Ross	158	Pier	Sch	Fir	67
Bethlehem EH	4000	2695	Own	4 x5¼	25.6	L	T	Fed	F	Strm	G	Bos	G	B	Det	3	U	UP	I	Russ	10.2:1	32.64:1	Shel	34x4	34x6	Lav	144	Pier	Wan	Fir	85
Bets D2	4750	.....	Buda	4¼x5½	28.9	L	C	T	F	Strm	...	Bos	...	L	B Li	4	....	UM	W	Timk	.....	.....	Tut	36x4	36x7	Ross	150	Pier	.....	.....	75
Brinton F	4600	3400	Cont	4½x5¼	27.2	L	C	T	F	Strm	G	Bos	...	D	Selec	3	U	Spic	W	Flot	1:1	3.36:1	S-El	36x4	36x6	Ross	Q	Pier	Sch	.....	....
Brockway K4	4700	3200	Cont	4½x5¼	27.2	L	C	Bus	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	8.5:1	34:1	Mer	36x4	36x7	Gem	152	Opt	Hoo	.....	80
Capitol C	.....	4500	Wis	4½x6	32.4	...	T	T	...	Zen	...	Bos	B	E	Cott	4	....	Ther	W	Wis	10:1	.....	SP	36x6	36x6	Ross	170	Pier	.....	.....	85
Chicago C2½	4500	3250	Her	4 x5½	25.6	L	C	T	F	Strm	G	Bos	...	L	B-Li	4	U	Peters	W	Timk	8.5:1	34:1	Math	36x4	36x7	Gem	156	Simp	Q	Stn	....
Clydesdale 65X	4850	3175	Cont	4½x5¼	27.2	L	C	T	S	Zen	G	Bos	...	L	B-Li	4	A	Spic	W	Timk	8.5:1	34:1	Stan	36x4	36x8	Ross	163	Own	Smi	.....	73
Columbia G	4250	2850	Hink	4 x5¼	25.6	L	C	T	F	Strm	V	Bos	...	D	Cott	4	A	Spic	I	Russ	9.5:1	.....	Per	36x4	36x7	Own	148	Hink	Det	Fir	80
Concord B	4600	3400	Buda	4¼x5½	28.9	L	C	T	S	Zen	G	Eis	...	L	B Li	4	U	Spic	W	Timk	8.5:1	34:1	Per	36x4	36x4†	Ross	150	Mon	Arc	Fir	70
Corbitt B	5000	3650	Cont	4½x5¼	27.2	L	C	McC	B	Strm	V	Eis	...	D	B-Li	4	U	Hart	W	Shel	8.75:1	35:1	Shel	36x4	36x7	Ross	148	Simp	Bim	Fir	75
Dart M	4800	3000	Buda	4¼x5½	28.9	L	C	C	F	Zen	G	Eis	...	F	Full	4	U	Spic	W	Own	8.5:1	38:1	Per	36x4	36x7	Ross	150	Pier	Pru	.....	80
Day-Elder C	5000	2950	Buda	4¼x5½	28.9	L	P	Bus	B	Zen	G	Eis	...	V	Covt	3	U	Hart	W	Shel	10.33:1	37.9:1	IC	36x4	36x7	Gem	150	Mon	Jon	Fir	70
DeKalb E2½	4800	2600	Cont	4½x5¼	27.2	L	P	T	F	Mas	G	Eis	...	F	Full	3	U	K-B	W	Flot	9.33:1	33:1	Math	36x5	36x6	Ross	144	....	Hay	.....	79.4
Denby 25	4790	3400	Cont	4½x5¼	27.2	L	C	Lng	B	Strm	G	Eis	...	F	Full	4	U	UP	I	Russ	9.45	45.3	Det	36x4	36x7	Ross	150	Mon	Smi	.....	79
Dependable E	5600	2950	Buda	4¼x5½	28.9	L	C	T	F	Zen	V	Dix	W	F	Full	4	A	Acme	W	Wis	8.66:1	13.46:1	Per	36x4	36x7	Ross	157	Pier	Bim	Fir	70
Doane 1919	5000	....	Wau	4¼x5¼	28.9	...	C	C	S	Mas	...	Bos	...	D	Selec	3	U	.....	C	Dead	7.72:1	.....	.....	36x5	36x7	Lav	147	Wau	.....	.....	79
Erie 2½	5400	....	Buda	4¼x5½	28.9	L	C	McC	B	Strm	G	Bos	...	D	Full	4	A	Spic	W	Shel	.....	.....	Per	34x4	36x6	Ross	150	Pier	Hoo	.....	80
Fageol 3400	4600	....	Wau	4¼x5¼	28.9	L	C	Spi	S	Zen	G	Dix	...	B	Selec	5	A	Spic	W	Timk	5.6:1	59.5:1	Math	34x4	36x7	Ross	144	Wau	Pru	.....	80
Gary J	4850	3150	Buda	4¼x5½	28.9	L	C	T	F	Mas	G	Eis	...	L	Full	4	U	Spic	W	Timk	8.5:1	41:1	Det	36x4	36x7	Ross	148	McC	Pru	Gdy	....
Gersix K	5200	3500	Buda	4¼x5½	28.9	L	C	Idl	F	Strm	V	Bos	...	B	Cott	3	U	Bld	W	Own	9.66:1	39:1	Tut	36x4	36x7	Ross	150	Nier	Jon	.....	75
Gramm-Bernstein 25	5300	3875	Hink	4¼x5½	28.9	L	C	T	F	Strm	V	Eis	...	D	Own	4	A	Own	W	Stan	7.75:1	36.7:1	S-El	36x4	36x4†	Ross	150	Hink	Smi	Fir	91.3
Hahn EE	4800	.....	.....	4½	32.4	L	C	Own	F	Strm	G	Bos	...	D	B-Li	3	....	Spic	W	Timk	7.75:1	.....	.....	36x4	36x8	Ross	145	Pier	.....	.....	65
Harvey WFA	5300	3300	Buda	4¼x5½	28.9	L	P	....	B	Zen	G	Eis	...	B	B-Li	4	A	Spic	W	Shel	7.75:1	31:1	Shel	36x4	36x7	Ross	150	Mon	Sch	.....	80
Hendrickson I	.....	.....	Buda	4¼x5½	28.9	L	C	T	F	Strm	G	Dix	...	D	Full	4	A	Ther	W	Timk	7.75:1	37.2:1	S-El	36x4	36x7	Ross	Q	McC	Stn	.....	80
Hewitt-Ludlow	4800	.....	Buda	4¼x5½	28.9	...	...	T	F	Strm	...	.....	...	B	Cott	4	.....	Spic	W	Wis	.....	.....	.....	36x4	36x7	Ross	150	.....	.....	.....	....
H. R. L. H	.....	.....	Hink	4x5¼	25.6	L	C	Fed	F	Zen	...	Bos	...	D	B-Li	4	.....	.....	W	Shel	.....	.....	S-El	36x4	36x4†	Ross	154	Hink	Sch	.....	....
Huriburt 2½	5600	3750	Buda	4¼x5½	28.9	L	P	Own	F	Fich	G	Eis	...	M	B-Li	3	.....	.....	W	Hind	.....	.....	Per	36x4	36x4	Ross	170	Dup	Wau	.....	85
Indepen't H, Youngst'n, O	4600	....	Cont	4½x5¼	27.2	L	P	T	C	Sheb	G	Eis	...	F	Full	3	U	Spic	W	Wis	9.66:1	39:1	S-El	36x4	36x8	Ross	148	Pier	.....	.....	85
Indiana 25	5500	3350	Own	4½x5½	27.2	L	C	T	F	Strm	G	Eis	...	B	Selec	4	A	Acme	W	½-Fl	7.75:1	39.5:1	S-El	36x4	36x8	Wohl	156	Pier	Bim	.....	71.5
Jumbo 25	4800	3450	Buda	4¼x5½	28.9	L	P	Own	F	Zen	G	Eis	Q	F	Full	4	U	Arv	I	Cl	9:1	4.84:1	Det	36x4	36x7	Jac	152	Dup	Day	.....	75
Kalamazoo H	6200	....	Wis	4x6	25.6	L	P	G&O	F	Strm	V	Bos	D	D	Full	4	A	Acme	W	Shel	8.5:1	42.8:1	Shel	36x4	36x8	Ross	160	Pier	Smi	.....	80
Kankakee E2½	4200	2875	Cont 6	3½x5¼	29.4	L	C	H	F	Zen	V	Del	D	D	Warn	3	U	Acme	I	Russ	7.4:1	22.2:1	Tem	34x4	34x6	Ross	170	.....	Bim	Gdy	70
Karavan	5700	....	Buda	4¼x6	28.9	L	C	Fed	...	Zen	...	Ber	...	L	B-Li	4	A	Spic	W	Shel	.....	.....	Shel	36x4	36x8	Ross	148	Dup	Smi	.....	....
Kelly-Springfield K35	5200	3500	Own	3¾x5¼	22.5	L	C	Fed	F	Zen	G	Eis	W	C	Covt	3	A	Own	C	Dead	10.64:1	35.11:1	Per	36x4	36x4†	Gem	144	Pier	StM	.....	89
Kelly-Springfield K36	5540	3500	Own	3¾x5¼	22.5	L	C	Fed	F	Zen	G	Eis	W	C	Covt	3	A	Spic	W	½-Fl	10.33:1	34.02:1	Per	36x4	36x4†	Gem	144	Pier	StM	.....	89
Kimball C	5100	3975	Wis	4¼x6	28.9	L	C	Flex	F	Zen	V	Ber	W	L	B-Li	4	A	Spic	W	Shel	7.75:1	37.31:1	US	36x4	36x7	Ross	Q	Dup	Smi	Fir	66
Kleiber B	.....	3800	Cont	4½x5½	32.4	...	...	...	...	Strm	G	Bos	...	...	B-Li	4	A	.....	W	.....	7.75:1	37.5:1	.....	36x5	36x8	Ross	160	.....	W&L	.....	....
Koehler M	5050	3365	Her	4 x5½	25.6	L	C	T	P	Zen	G	Eis	...	D	B-Li	4	A	Spic	W	Timk	9.25:1	37:1	Math	36x4	36x7	Lav	162	Simp	Wan	SAE	75
Larrabee-Deyo K	5200	....	Cont	4½x5¼	27.2	L	C	Bus	S	Sheb	G	Bos	...	L	B-Li	4	A	Opt	W	Shel	8.75:1	35:1	Mer	36x4	36x7	Ross	176	Simp	Hoo	.....	....
L.M.C2-20	4500	2950	Cont	4½x5¼	27.2	L	C	T	S	Strm	P	Bos	R	B	Det	4	A	Mech	I	Russ	8.8:1	38.72:1	Math	36x4	36x4†	Lav	164	Pier	Bim	.....	80
Maccar H2½	5000	3500	Cont	4½x5½	32.4	L	C	Own	B	Strm	G	Eis	...	L	B-Li	3	U	Spic	W	Timk	7.75:1	31.08:1	Mer	36x4	36x4†	Ross	162	Pier	Sch	Fir	70
Master M	4300	2890	Buda	4¼x5½	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	Spic	I	Torb	8:1	32:1	Det	34x4	36x7	Ross	144	McC	Pru	.....	76
Master O	4400	2990	Buda	4¼x5½	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	Spic	I	Torb	8:1	32:1	Det	34x4	36x7	Ross	170	McC	Pru	.....	76

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3½ Ton—Continued

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
Federal WD.	7000	3850	Cont	4½x5½	32.4	L	C	T	B	Zen	G	Eis	...	B	Own	4	A	Spic	W	Timk	10.33:1	51.56:1	Math	36x5	36x5†	Gem	156	Phar	Smi	Fir	74.5
Garford 77D	7550	....	Buda	4½x6	32.4	L	C	T	F	Strm	G	Spl	...	L	Selec	4	A	Spic	W	Timk	8.75:1	.....	Per	36x5	36x5†	Ross	162	Simp	Smi	.....	....
Gary KT.	7000	4050	Buda	4½x6	32.4	L	C	T	F	Mas	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	10.33:1	41.32:1	Det	36x5	40x5†	Ross	162	McC	Pru	.....	....
Giant 17.	6800	4150	Cont	4½x5½	32.4	L	P	Own	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Shel	10.25:1	49.61:1	Shel	36x5	36x5†	Ross	176	Pier	Wan	.....	70
G.M.C. 71A	7540	....	Cont	4½x5½	32.4	L	C	McC	P	Mar	G	Eis	...	D	Selec	4	A	Own	W	Timk	12:1	58.6:1	Det	36x5†	40x5†	Jac	163	Mon	Own	SAE	75
G.M.C. 71B.	7655	....	Cont	4½x5½	32.4	L	C	McC	P	Mar	G	Eis	...	D	Selec	4	A	Own	W	Timk	12:1	58.6:1	Det	36x5	40x5†	Jac	187	Mon	Own	SAE	75
Gramm-Bernstein 35.	8640	4775	Hink	4½x5½	32.4	L	C	T	F	Strm	V	Eis	...	D	Own	4	A	Own	W	Stan	8.75:1	50.6:1	S-El	36x5	40x5†	Ross	156	Hink	Smi	Fir	91.7
Hahn F.	6600	....	.....	4½	32.4	L	C	Own	F	Strm	..	Bos	...	D	B-Li	4	A	Spic	W	Timk	10:1	.....	.....	36x5	36x5†	Ross	Q	Pier	.....	.....	65
Hall.	6825	4100	Cont	4½x5½	32.4	L	P	Own	B	Zen	G	Bos	...	L	B-Li	..	A	Opt	W	Timk	10.33:1	.....	Det	36x5	36x5†	Gem	Q	Dup	Smi	.....	....
Harvey WHA.	7700	4300	Buda	4½x6	32.4	L	P	T	B	Zen	G	Eis	...	B	B-Li	4	A	Spic	W	Shel	8.75:1	42.35:1	Shel	36x5	36x5†	Ross	160	Mon	Smi	.....	80
Hendrickson J.	.....	....	Buda	4½x5½	28.9	L	C	T	F	Strm	G	Dix	...	D	Full	4	A	Ther	W	Timk	10.33:1	49.6:1	Tut	36x5	36x5†	Ross	Q	McC	Stn	.....	80
Hewitt-Ludlow.	6300	....	Buda	4½x5½	28.9	..	..	.....	..	Strm	..	Bos	...	B	Cott	4	....	Spic	W	Wis	.....	.....	.....	36x5	36x5†	Ross	156	.....	.....	.....	....
Hurlburt.	6400	4400	Buda	4½x6	32.4	L	C	T	B	Fleh	G	Eis	...	D	B-Li	4	A	Spic	W	Flot	8.66:1	41.91:1	.....	36x5	36x5	Ross	156	Dup	Wan	.....	....
Indiana 35.	7000	4150	Own	4½x5½	30.6	L	C	T	F	Strm	G	Eis	...	B	Selec	4	A	Spic	W	½-Fl	10.25:1	49.6:1	S-El	36x5	36x5†	Wohl	160	Pier	Smi	.....	75
International L.	7500	4500	Own	4¼x5	28.9	I	C	T	Own	B	Ens	G	Dix	O	D	Own	4	A	Own	I	Own	11:1	53.25:1	.....	36x5	40x10	Own	160	Own	Own	Fir	50
Jackson B.	7000	4250	Cont	4½x5½	32.4	L	C	T	B	Strm	...	Eis	D	B	Selec	4	....	Spic	B	Own	9.18:1	43.49:1	Per	36x7	36x7	Ross	150	Pier	.....	.....	65
Jumbo 35.	6400	4550	Buda	4½x6	32.4	L	P	Own	F	Zen	G	Eis	Q	L	B-Li	4	U	Spic	I	Cl	9:1	5.35:1	Per	36x5	36x10	Jac	165	Simp	Day	.....	75
Kalamazoo K.	7300	....	Wis	4¼x6	28.9	L	P	G&O	F	Strm	V	Bos	D	F	Full	4	A	Acme	W	Shel	10.25:1	49.8:1	Shel	36x5	36x5†	Ross	160	Pier	Smi	.....	80
Kelly-Springfield K40.	8285	4400	Own	4½x6½	32.4	T	C	Fed	F	Rayf	G	Eis	W	C	Covt	3	A	Own	C	Dead	10.48:1	31.6:1	Per	36x5	40x5†	Gem	150	Pier	StM	.....	93
Kissel Heavy Duty	6840	4175	Own	4¼x5½	28.9	L	C	MeC	S	Strm	V	Eis	...	W	Warn	4	A	Spic	W	Shel	11.75:1	58.6:1	Shel	36x5	36x5†	Ross	168	Pier	Smi	.....	74
Kleiber C.	.....	4400	Cont	4½x5½	32.4	..	..	.....	..	Strm	G	Bos	...	..	B-Li	..	A	.....	W	.....	8.75:1	42.35:1	.....	36x5	36x10	Ross	163	.....	W&L	.....	....
Larrabee-Deyo L.	6850	....	Cont	4½x5½	32.4	L	C	Bus	S	Sheb	G	Bos	...	L	B-Li	4	A	Opt	W	Shel	10.25:1	41:1	Mer	36x5	36x5†	Ross	186	Simp	Hoo	.....	....
Maccar M2.	6175	4500	Wis	4½x6	32.4	L	C	Own	B	Strm	G	Eis	...	L	B-Li	4	U	Spic	W	Timk	8.75:1	35.09:1	Mer	36x5	36x5†	Ross	174	Pier	Day	Fir	70
Mack AC.	8070	4950	Own	5 x6	40	L	C	Own	S	Zen	G	Aer	...	O	Own	3	UJ	Spic	C	OwnD	8.49	27:2	Mer	36x5	40x5†	Gem	Q	Own	Sch	.....	65
Master A.	7000	4190	Buda	4½x6	32.4	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	A	Spic	W	Timk	10.33:1	41.32:1	Det	36x5	40x5†	Ross	158	Pier	Smi	.....	72
Master AL.	7200	4290	Buda	4½x6	32.4	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	A	Spic	W	Timk	10.33:1	41.32:1	Det	36x5	40x5†	Ross	194	Pier	Smi	.....	72
Menominee G.	.....	4270	Cont	4½x5½	32.4	L	C	T	B	Strm	G	Eis	...	E	Full	4	A	Spic	W	Wis	10.33:1	41.32:1	Tut	36x5	36x5†	Ross	160	Pier	Stn	Fir	80
Nelson & LeMoon F3½.	6000	....	Cont	4¼x6½	28.9	T	C	T	S	Strm	G	Bos	...	L	B-Li	4	U	Own	W	Timk	8.75:1	42:1	Tut	36x5	36x5†	Lav	Q	Mon	Pru	Gdy	80
Noble E70.	6500	....	Buda	4½x6	32.4	L	C	T	F	Strm	G	Eis	W	F	Full	4	A	M&E	W	Shel	8.75:1	42:1	S-El	36x5	36x10	Lav	182	Pier	Bim	Fir	85
Northway B3.	7260	....	Own	4 x6	25.6	I	C	GO	P	Sheb	V	Bat	W	F	Full	4	U	Spic	W	Shel	10.25:1	49.2:1	Per	36x5	40x5†	Ross	160	Pier	Cla	.....	72
O.K. 3½T.	.....	4150	Buda	4¼x6	32.4	L	P	R-T	B	Zen	V	Eis	...	F	Full	4	A	Hart	W	Wis	.....	.....	Tut	36x5	36x5†	Ross	164	Pier	.....	.....	....
Old Reliable C.	6650	4250	Wis	4¼x6	28.9	L	C	T	B	Strm	V	Bos	...	D	Full	4	A	Spic	W	Shel	8.75:1	42.5:1	Shel	34x5	36x5†	Ross	160	Mon	StM	.....	75
Oneida D9.	6830	4345	Own	4½x5½	32.4	L	C	Own	...	Strm	...	Mag	...	D	Own	4	A	Own	W	Own	10.25:1	48:1	S-El	36x5	36x10	W	170	Own	.....	.....	....
Paige 51-18.	6900	4150	Cont	4½x5½	32.4	L	C	T	S	Strm	G	Bos	Q	L	B-Li	4	A	Spic	W	Timk	10.33:1	49.7:1	Per	36x5	36x5†	Jac	160	Simp	Opt	Fir	85
Parker J20.	6200	....	Wis	4½x6	32.4	L	C	Own	F	Strm	G	Bos	W	L	Warn	4	A	Bld	W	Own	7.8:1	38.92:1	S-El	38x7*	44x10	Ross	160	Mon	Bim	.....	76
Pioneer A, Detroit, Mich..	8000	4190	Cont	4½x5½	32.4	L	C	Lng	B	Strm	V	Eis	...	L	B-Li	4	A	Spic	W	Timk	8.75:1	35:1	Per	36x5	36x5†	Gem	160	Mon	.....	Fir	....
Republic 20.	6250	3845	Cont	4½x5½	32.4	L	C	T	B	Strm	G	Bos	...	D	Full	4	U	Hart	I	Torb	10.26:1	48:1	S-El	36x5	36x10	Jac	165	Phar	Smi	Fir	....
Reynolds 7A.	.....	....	Hink	4½x5½	32.4	I	C	Lng	F	Strm	G	Bos	W	V	Coyt	4	A	Snead	W	Shel	8.75:1	44.36:1	S-El	36x5	36x5†	Lav	176	Hink	Smi	.....	80
Sandow M.	6500	4395	Cont	4½x5½	32.4	L	P	T	B	Strm	G	Bos	...	D	B-Li	4	A	Spic	W	Timk	10.33:1	42:1	GC	36x5	36x5†	Ross	175	Mon	Pru	.....	70
Sanford W35.	6750	4050	Cont	4½x5½	32.4	L	P	T	F	Strm	G	Bos	...	B	B-Li	4	A	Spic	W	Shel	8.75:1	13.15:1	S-El	36x5	36x5†	Ross	174	Pier	Hoo	Fir	75
Schacht.	6500	....	Buda	4¼x6	28.9	L	P	Own	F	Sheb	G	Bos	...	O	Own	4	A	Flex	W	Own	.....	.....	Nat	36x5	36x5†	Own	168	Dup	StM	.....	70
Selden 3½A.	7100	4325	Cont	4½x5½	32.4	L	P	Lng	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	8.75:1	42:1	Per	36x5	36x10	Gem	162	Pier	Arc	.....	70
Service 71.	6930	4285	Buda	4¼x5½	28.9	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	8.75:1	42.3:1	.....	36x5	36x5†	Ross	171	Simp	.....	.....	70
Service 76.	7280	4485	Buda	4½x6	32.4	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	7.8:1	37.7:1	.....	36x5	36x5†	Ross	171	Simp	.....	.....	70
Signal M.	7070	4275	Cont	4½x5½	32.4	L	C	MeC	B	Strm	G	Eis	...	B	B-Li	4	A	Spic	W	Timk	12:1	58:1	Det	36x5	40x10	Ross	168	Pier	Hay	Gdy	80
Standard 66.	6480	....	Cont	4½x5½	32.4	L	P	Lng	S	Strm	V	Eis	...	D	B-Li	4	A	Spic	W	Timk	10.33:1	41.4	S-El	36x5	36x5†	Gem	160	Mon	.....	.....	70
Sterling 3½.	8300	4650	Ster	4½x6¼	32.4	L	C	Own	P	Rayf	V	Eis	...	M	Own	3	A	Spic	W	Timk	8.75:1	39.5:1	Math	36x5	40x5†	Ross	162	Wau	Pru	.....	92
Stewart 10.	6080	3895	Cont	4½x5½	32.4	L	P	T	B	Zen	G	Eis	...	F	Full	4	U	Hart	I	Cl	10:1	48:1	Det	36x5	36x5†	Ross	165	Pier	Cla	Fir	80
Tiffin PW.	6850	4375	Cont	4½x5½	32.4	L	C	T	S	Sheb	G	Bos	...	F	Full	4	A	Acme	W	Shel	8.7:1	41.7:1	Kal	36x5	36x5†	Ross	160	Pier	Smi	Gdy	80
Titan 3½.	5300	....	Buda	4½x6	32.4	L	P	T	F	Strm	G	Eis	...	D	Cott	4	A	UP	I	Cl	9:1	48:1	Math	36x5	40x5†	Lav	156	Simp	Day	.....	70
Tower G3½.	6800	4335	Cont	4½x5½	32.4	L	C	T	S	Strm	G	Bos	...	F	Full	4	U	Spic	W	Timk	10.33:1	50:1	Det	36x5	36x5†	Ross	165	Pier	.....	.....	70
Twin City 3½.	6800	....	Own	4¼x6	28.9	I	C	Spi	F	Sheb	V	Bos	...	B	Full	4	A	Opt	W	Timk	10.33:1	49.58:1	Math	36x5	40x5†	Ross	168	Own	Smi	.....	80
Twin City 4 Wheel D-B.	7200	4750	Wis	5½x6	42	T	C	H	B	Strm	G	K-W	...	M	Cott	3	A	.....	I	½-Fl	.....	.....	.....	36x6	36x6	Ross	140	Pier	Arc	SAE	60
United C.	.....	3750	Buda	4¼x5½	28.9	L	C	.....	F	Strm	G	Eis	Q	L	B-Li	4	A	Bld	I	Cl	10:1	.....	.....	36x5	36x5†	Ross	160	Simp	Cla	Fir	80
Victor M.	6600	....	Cont	4½x5½	32.4	L	C	Own	B	Strm	..	Bos	...	L	B-Li	4	....	Spic	W	Timk	.....	.....	S-El	36x6	36x5†	Gem	176	.....	.....	.....	....
Ward LaFrance 4A.	7750	4490	.....	4½x6¼	32.4	L	C	T	F	Zen	G	Bos	...	L	B-Li	4	A	Spic	W	Timk	6.28:1	30.38:1	.....	36x5	36x5†	Ross	162	.....	Smi	.....	85
Wichita O.	6500	4000	Beav	4¼x6	28.9	I	P	EM	C	Strm	G	Ber	...	C	Cott	4	A	Own	W	Shel	11.33:1	61:1	.....	36x5	36x5†	Ross	165	Dup	Smi	.....	80
Wilcox E.	6600	....	Buda	4½x6	32.4	L	P	T	S	Strm	G	Mag	...	C	Selec	4	A	Own	W	½-Fl	10.25:1	45.1:1	Shel	36x5	36x5†	Own	147	Pier	.....	.....	75
Wilson G.	6800	4300	Own	4½x5½	32.4	L	C	T	B	Mar	G	Eis	...	B	Own	4	A	K-B	W	Timk	8.75:1	42.35:1	Per	36x5	36x5†	Ross	160	Pier	Smi	.....	80
Winther 70.	6400	4200	Wis	4 x6	25.6	L	P	T	G	Mas	V	Eis	B	B	B-Li	4	A	Bld	I	Cl	9:1	36:1	Math	36x5	36x5†	Ross	150	.....	Cla	Fir	85

4 Ton

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
Bessemer K2.	6740	....	Cont	4½x5½	32.4	L	C	C	B	Strm	G	Bos	...	B	B-Li	4	A	Spic	I	Torb	10:1	49.5:1	Per	36x5	36x10†	Ross	175	Pier	Sch	Fir	75
Double-Drive B.	.....	4000	Rut	4½x5½	27.2	L	P	T	S	Strm	..	Bos	...	..	Own	3	....	Own	W	½Fl	9.6:1	.....	Elip	36x7	36x7	Lav	124	Pier	.....	.....	55
Highway-Knight A.	7400	.....	4 x6	25.6	S	P	T	Own	F	Zen	V	Mag	R	O	Own	4	A	Ther	W	.....	8.75:1	42.35:1	.....	36x5	36x6†	.....	159	.....	Sch	.....	90
Jumbo 40.	6800	5200	Buda	4½x6	32.4	L	P	Own	F	Zen	G	Eis	Q	L	B-Li	4	U	Spic	I	Cl	10:1	5.35:1	Per	48x7*	44x10	Jac	165	Simp	Cla	.....	75
Kelly-Springfield K45.	8730	4550	Own	4½x6½	32.4	T	C	Fed	F	Rayf	G	Eis	W	C	Covt	3	A	Own	C	Dead	10.71:1	32.3:1	Per	36x5	40x6†	Gem	150	Pier	StM	.....	93
Kimball E.	8100	5000	Wis	4½x6	36.1	T	C	Flex	F	Zen	V	Ber	W	L	B-Li	4	A	Spic	W	Shel	8.75:1	42.35:1	US	36x5	40x10	Ross	Q	Dup	Smi	Fir	66
King Zeitler.	6500	....	Cont	4½x5½	32.4	L	C	T	B	Strm	G	Bos	...	L	B-Li	4	A	Ther	W	Timk	10.33:1	49:1	Mer	36x5	40x5†	Lav	172	Pier	StM	SAE	80
Moreland 20G.	7810	4875	Cont	4½x6	36.1	L	C	Own	F	Mill	G	Dix	...	D	Selec	4	A	Ther	W	Timk	7.8:1	37.71:1	US	36x5	40x5†	Ross	162	Cont	Smi	SAE	...
Packard E., E.	7460	4650	Own	4½x5½	32.4	L	C	T	F	Own	F	Dix	B	D	Selec	4	A	Spic	W	Flot	10	46	.....	36x5	40x5	Own	156	Own	.....	.....	55
Riker BB.	7200	4700	Own	4¾x6	28.9	T	C	T	B	B&B	G	Ber	W	C	Selec	4	A	Own	W	Own	10:1	42.5:1	.....	36x5	36x6†	Ross	150	Own	.....	.....	77

Rowe HW	6370	4350	Wis	4¼x6	28.9	L	C	Fed	F	Zen	G	Bos		L	B-Li	4	U	Spic	W	Shel	8.75:1	12.75:1	Shel	36x5	36x6†	Ross	156	Simp	Hoo		84							
Schwartz DWS	7700	4500	Buda	4½x6	32.4	L	C	Fed	F	Strm	G	Bos		E	Full	4	A	M&E	W	Thom	12:1	42:1	Row	36x6	36x10	Ross	156	Simp	Smi	Fir							
Schwartz DW	7700	4500	Buda	4½x6	32.4	L	C	Fed	F	Strm	G	Bos		F	Full	4	A	M&E	W	Thom	12:1	72:1	Row	36x6	36x10	Ross	170	Simp	Smi	Fir							
Schwartz DWL	7700	4600	Buda	4½x6	32.4	L	C	Fed	F	Strm	G	Bos		F	Full	4	A	M&E	W	Thom	12:1	72:1	Row	36x6	36x10	Ross	186	Simp	Smi	Fir							
Union H	6600	3975	Wis	4½x6	28.9	L	P	GO	F	Sheb	G	Eis		F	Full	4	U	UP	I	Torb	10.25:1	49.2:1	Math	36x6	36x10	Ross	174	Dup	Smi		75							
U. S., S	7000	4995	Own	4½x5¾	32.4	L	C	T	S	Strm	G	Eis		D	B-Li	4	A	Opt	W	Shel	10.25:1	54.84:1	Shel	36x5	36x5†	Lav	168	Own	Sch		85							

5 Ton

5 Ton

Acason M	8350	5850	Wau	5 x6¼	40	L	P	Can	B	Mar	V	Eis		E	Cott	4	A	Bld	W	Timk	10.25:1	53.3:1	Det	36x6	40x6†	Ross	187	Wau	Smi	Opt								
Acme E	8860	5150	Cont	4¾x6	36.1	L	C	GO	F	Rayf	V	Eis		B	Cott	4	A	Bld	W	Timk	11.66:1	61:1	Det	36x6	40x6†	Ross	180	Cont	Smi		80							
Atterbury 8E	9340	5575	Cont	4¾x6	36.1	L	C	T	F	Zen	V	Ber		L	B-Li	4	A	Spic	W	Timk	11.6:1	56.14:1	SP	36x5	40x6†	Gem	167	Cont	Day		98							
Available H5	9500	5575	Cont	4¾x6	36.1	L	C	Chic	B	Strm	V	Bos		L	B-Li	4	A	Spic	W	Timk	11.66:1	56.4:1	S-El	36x6	40x12	Ross	190	Cont	Smi		90							
Brockway T	8800	5250	Cont	4¾x6	36.1	L	C	Bus	F	Strm	V	Eis		L	B-Li	4	A	Spic	W	Timk	11.66:1	56.43:1	Mer	36x6	40x6†	Gem	174	Cont	Smi		70							
Capitol E		6000	Wis	5 x6	40		T	T		Zen		Bos	B	E	Cott	4		Ther	W	Wis			SP	40x7	40x7	Ross	194	Pier			85							
Clydesdale 120B	8500	4975	Cont	4¾x6	36.1	L	C	T	F	Strm	V	Bos		L	B-Li	4	A	Spic	W	Timk	11.66:1	56.5:1	Stan	36x6	40x12	Ross	176	Own	Smi		76							
Corbitt AA	8000	5500	Cont	4¾x6	36.1	L	C	MoC	F	Strm	V	Eis		D	B-Li	4	A	Bld	W	Shel	10.25:1	49.61:1	Shel	36x6	40x6†	Ross	178	Cont	Smi		75							
Couple Gear AC	11000	6700	Wis	5¼x7	44.1	T	G	H	F	Strm	G	Eis	O		Own	5		Own	B	Own	25.1:1		Tut	36x5†	36x5†	Own	144		Own	Own	60							
Day-Elder E	8250	4600	Buda	4½x6	32.4	L	P	Bus	F	Zen	G	Eis		L	B-Li	4	A	Hart	W	Shel	10.25:1	49.6:1	Shel	36x5	40x6†	Gem	170	Mon	Smi	Fir	70							
Denby 210	8590	5100	Cont	4½x5½	32.4	L	C	Lng	B	Strm	G	Eis		D	Warn	4	A	Peters	I	Russ	12.55:1	62.7:1	Det	36x6	40x6†	Ross	170	Simp	Cla		80							
Diamond T,S	8790	5900		4¾x6	36.1	L	C	T	B	Strm	G	Bos			Selec	4	A	Spic	W		11.66:1	56.43:1	Math	36x6	40x6†	Gem	180											
Fageol 5300	8300		Wau	4½x6¼	32.4	L	C	Spi	F	Zen	V	Dix		B	Selec	5	A	Spic	W	Timk	8.42:1	89:1	Math	36x6	40x6†	Ross	172	Wau	Pru		80							
Federal XC	8100	4550	Cont	4½x5½	32.4	L	C	T	B	Zen	G	Eis		B	Own	4	A	Spic	W	Timk	13.66:1	68.19:1	Math	36x6	40x6†	Gem	156	Phar	Smi	Fir	77.5							
Garford 68	8870		Wis	4¾x5½	36.1	T	C	T	F	Rayf	G	Eis		L	Selec	4	A	Spic	C	Dead	11.4:1		Per	36x6	40x6†	Ross	128	Simp	Smi									
Gary M	8500	5150	Buda	5 x6½	40	L	C	Mas	G	Eis		L	B-Li	4	A	Spic	W	Timk	11.66:1	56.43:1	Det	36x6	40x6†	Ross	182	McC	Day										
G.M.C. 101A	8485		Cont	4½x5½	32.4	L	C	MoC	P	Mar	G	Eis		D	Selec	4	A	Own	W	Timk	13.6:1	66.7:1	Det	36x6†	40x6†	Jac	163	Mon	Own	SAE	75							
G.M.C. 101B	8655		Cont	4½x5½	32.4	L	C	MoC	P	Mar	G	Eis		D	Selec	4	A	Own	W	Timk	13.6:1	66.7:1	Det	36x6†	40x6†	Jac	187	Mon	Own	SAE	75							
Gramm-Bernstein 50	9860	5875	Lib	4¾x6	36.1	L	C	T	F	Strm	V	Eis		D	Own	4	A	Own	W	Stan	9.5:1	55:1	S-El	36x6	40x6†	Ross	168	Cont	Smi	Fir	92.2							
Hahn FE	8400			4¾	36.1	L	C	Own	F	Strm	V	Bos		D	B-Li	4	A	Spic	W	Timk	10:1			36x6	40x6†	Ross	Q	Cont			65							
Hall	8400	5100	Cont	4½x5½	32.4	L	T	Own	B	Zen	G	Bos		L	B-Li		A	Opt	W	Timk	11.66:1		Per	36x5	40x6†	Gem	Q	Dup	Smi									
Harvey WKA	8900	5200	Buda	4½x6	32.4	L	P	T	B	Zen	G	Eis		B	B-Li	4	A	Spic	W	Shel	8.75:1	42.35:1	Shel	36x6	40x6†	Ross	160	Mon	Smi		80							
Hendrickson K			Wau	5 x6¼	40	L	C	T	F	Strm	G	Dix		D	B-Li	4		Ther	W	Timk	11.66:1	57:1	S-El	36x6	40x6†	Ross	Q	Wau	Stn									
Hewitt-Ludlow	8000		Buda	4½x6	32.4					Strm		Bos		B	Cott	4		Spic	C					36x6	40x6†	Lav	168										
Highway-Knight B5				4 x6	25.6	S	T	Own	F	Zen	V	Mag	R	O	Own	4	A	Ther	W		10.2:1	49.4:1		36x5	40x6†		159		Sch		90							
Hurlburt	7800	5250	Buda	4½x6	32.4	L	C	T	B	Fich	G	Eis		D	B-Li	4	A	Spic	W	Flot	10.66:1	49.99:1		36x5	40x6†	Ross	156	Dup	Wau									
Indiana 50	8700	5075	Wau	4¾x6¾	36.1	L	C	T	S	Strm	G	Eis		B	Selec	4	A	Spic	W	½-Fl	8.75:1	42.35	S-El	36x5	40x6	Wohl	170	Wau	Smi		78.5							
Kelly-Springfield K50	9175	5150	Own	4½x6½	32.4	T	C	Fed	F	Rayf	G	Eis	W	C	Covt	3	A	Own	C	Dead	12.24:1	44.5:1	Per	36x6	40x6†	Gem	150	Pier	StM		93							
Kimball F	8400	5975	Wis	5 x6	42	T	C	Flex	F	Zen	V	Ber	W	L	B-Li	4	A	Spic	W	Shel	8.75:1	42.35:1	US	36x6	40x12	Ross	Q	Dup	Smi	Fir	66							
Kissel Goliath	7200	4785	Own	4¼x5½	28.9	L	C	McC	S	Strm	V	Eis		W	Warn	4	A	Spic	W	Shel	13:1	65:1	Shel	36x6	36x6†	Ross	180	Pier	Smi		75							
Kleiber D		5300	Cont	5¼x5¾	44.1					Strm	G	Bos			B-Li		A		W		11.66:1	56.43:1		36x6	40x6	Ross	180		Smi									
Larrabee-Deyo W	9000		Cont	4¾x6	36.1	L	C	Bus	S	Sheb	G	Bos		L	B-Li	4	A	Opt	W	Shel	10.25:1	51:1	Mer	36x6	40x6†	Ross	186	Simp	Smi									
Mack AC	8650	5500	Own	5 x6	40	L	C	Own	S	Zen	G	Aer		O	Own	3	UJ	Spic	C	Own D	9	28.89	Mer	36x6	40x6†	Gem	Q	Own	Sch		68							
Master B	8000	5290	Buda	4¾x6½	36.1	L	C	T	B	Mas	V	Eis		D	B-Li	4	A	Spic	W	Timk	10.25:1	49.61:1	Det	36x6	40x6†	Ross	170	Pier	Smi		72							
Master BL	8200	5390	Buda	4¾x6½	36.1	L	C	T	B	Mas	V	Eis		D	B-Li	4	A	Spic	W	Timk	10.25:1	49.61:1	Det	36x6	40x6†	Ross	194	Pier	Smi		72							
Menominee J		5450	Wis	4¾x6	36.1	T	C	Lng	B	Strm	G	Eis		E	Cott	4	A	Spic	W	Wis	11.75:1	61:1	Tut	36x6	40x6†	Ross	160	Mon	Stn	Fir	80							
Moreland 20J	9000	5350	Cont	4¾x6	36.1	L	C	Own	F	Mill	G	Dix		D	Selec	4	A	Ther	W	Timk	10.25:1	49.61:1	US	36x6	40x6†	Ross	192	Cont	Smi	SAE								
Nelson & LeMoon F5	8000		Buda	4½x6	32.4	L	C	T	F	Strm	G	Bos	W	L	B-Li	4	A	Own	W	Timk	11.66:1	2:1	Tut	36x6	40x6†	Lav	Q	Pier	Pru	Gdy	80							
Old Reliable D	8400	5250	Wis	5.1x5½	41.9	T	C	T	B	Strm	V	Bos		W	D-Sea	4	A	Spic	W	Shel	8.75:1	41.5:1	Shel	36x5	40x6†	Ross	168	Mon	StM		80							
Oneida E9	9170	5460	Own	4½x5½	32.4	I	C	Own		Strm		Mag		D	Own	4	A	Own	W	Own	11.67:1		S-El	36x6	40x12	W	180	Own										
Packard F, E	8650	5450	Own	5 x5½	40	L	C	T	F	Own	P	Dix	B	D	Selec	4	A	Spic	W	Flot	10.66	49		36x6	40x6	Own	156	Own			57.2							
Parker M20	8500		Wis	4¾x6	36.1	L	C	Own	F	Strm	G	Bos	W	L	Warn	4	A	Bld	W	Own	10.25:1	51.15:1	S-El	36x6	40x6†	Ross	160	Simp	Bim		71							
Pierce-Arrow R9	8200	5500	Own	4 7/8x6	38.1	T	T	T	F	Strm	G	Dix		C	Selec	3	A	Own	W	Flot	7.8:1	29.5:1	S-El	36x5	40x6†	Own	168	Own	Own	Own	85							
Pioneer J.Detroit, Mich	9600	4990	Cont	4½x5½	32.4	L	C	Lng	B	Strm	V	Eis		L	B-Li	4	A	Spic	W	Timk	13.66:1	66.14:1	Per	36x6	40x6†	Gem	170	Mon		Fir								
Reynolds 10A			Hink	4½x5¾	32.4	I	C	Lng	F	Strm	G	Bos	W	V	Covt	4	A	Snead	W	Shel	10.25:1	51.96:1	S-El	36x6	40x6†	Lav	176	Hink	Smi		80							
Rowe FW	8350	5390	Wis	4½x6	32.4	T	C	Fed	F	Zen	G	Bos		L	B-Li	4	A	Spic	W	Shel	8.75:1	40.7:1	Shel	36x6	40x6†	Ross	169	Simp	Hoo		57							
Royal			Wis	4¾x5½	36.1	T	C	T		Strm		Bos	Q		Own			Own	W	Timk			Mer	36x6	42x6†	Ross	168	Mon										
Sandow L	7800	5175	Cont	4½x5½	32.4	L	P	T	B	Strm		Bos		D	B-Li	4	A	Spic	W	Timk	11.66:1	46.6:1	GC	36x6	40x6†	Ross	175	Mon	Stn		70							
Sanford-W50	7900	4950	Cont	4½x5½	32.4	L	P	T	F	Strm	G	Bos		B	B-Li	4	A	Spic	W	Shel	11.7:1	16.69:1	S-El	36x5	40x6†	Ross	174	Pier	Hoo	Fir	75							
Schacht	8000		Buda	4½x6	32.4	L	P	Own	F	Sheb	G	Bos		O	Own	8	A	Flex	W	Own			Nat	36x5	40x6†	Own	168	Dup	StM		70							
Schwartz DIS	7200	4500	Buda	4½x6	32.4	L	C	Fed	F	Str	G	Bos		F	Full	4	A	M&E	I	Torb	10.2:1	60:1	Row	36x6	36x10	Ross	156	Simp	Smi	Fir								
Schwartz DI	7200	4500	Buda	4½x6	32.4	L	C	Fed	F	Strm	G	Bos		F	Full	4	A	M&E	I	Torb	10.2:1	60:1	Row	36x6	36x10	Ross	170	Sinp	Smi	Fir								
Schwartz DIL	7200	4600	Buda	4½x6	32.4	L	C	Fed	F	Strm	G	Bos		F	Full	4	A	M&F	I	Torb	10.2:1	60:1	Row	36x6	36x10	Ross	186	Simp	Smi	Fir								
Selden 5A	8800	5770	Cont	4¾x6	36.1	L	C	T	B	Strm	G	Eis		L	B-Li	4	A	Spic	W	Timk	10.25:1	54.84:1	Per	36x6	40x12	Gem	164	Cont	Smi		70							
Service 101	8760	5275	Buda	4½x6	32.4	L	C	T	F	Strm	G	Eis		D	Selec	4	A	Spic	W	Timk	10.25:1	49.6:1		36x6	40x6†	Ross	171	Simp	Smi		75							
Signal R	8785	5300	Cont	4¾x6	36.1	L	C	MoC	B	Strm	G	Eis		B	B-Li	4	A	Spic	W	Timk	11.66:1	56:1	Det	36x6	40x12	Ross	180	Pier	Smi	Gdy	80							
Standard 86	8100		Cont	4¼x5½	32.4	L	P	Lng	S	Strm	V	Eis		D	B-Li	4	A	Spic	W	Timk	13.66:1	66:1	S-El	36x6	40x6†	Gem	160	Mon	Day		75							
Sterling 5-Worm	9700	5500	Ster	5x6¼	40	L	C	Own	P	Rayf	V	Eis		M	Own	3	A	Spic	W	Timk	8.80:1	39.79:1	Math	36x6	40x6†	Ross	168	Wau	Pru	Gdy	92							
Sterling 5-Chain	10000	6000	Ster	5x6¼	40	L	C	Own	P	Rayf	V	Eis		M	Own	6	A	UM	C	Own	7.04:1	42.5:1	Math	36x6	40x6†	Ross	174	Wau	Pru		91							
Tiffin	8400	5250	Cont	4¾x6	33.8	L	C	T	B	Sheb		Bos	W	D	Covt	3		Acme	W	Shel	8.7:1		Kal	36x6	40x6†	Ross	168				80							
Titan 6	5300		Buda	4½x6	32.4	L	P	T	F	Strm	G	Eis		D	Cott	4	A	UP	I	Cl	11:1	59:1	Shel	36x5	40x6†	Lav	156	Simp	Cla		70							
Twin City 4 Wh. Drive. A	8000	5250	Wis	5½x6	46.2	T	C	H	B	Strm	G	K-W		M	Cott	3	A		I	½-Fl				36x7		Ross	140	Pier	SAE		60							
United V		4950	Buda	4½x6	32.4	L			F	Strm	G	Eis	Q	L	B-Li	4	A	Bld	I	Cl				36x5	40x6†	Ross	160	Simp	Cla	Fir	80							
U.S.T	9200	5850	Own	4¾x6½	36.1	L	C	T	F	Strm	G	Eis		D	B-Li	4	A	Q	W	Shel	10.25:1	62.86:1	Shel	36x6	40x6†	Lav	172	Simp	Smi		90							
Walter 8	8000	5600	Wau	4½x6¾	32.4	L	C	T	F	Strm	G	Bos	W	D	Warn	4		M&E	I	Own	9:1	45:1	S-El	36x6	40x6†	Ross	168	Own	Day		80							
Ward LaFrance 5A	9300	5490		5x6¼	40	L	C	T	F	Zen	G	Bos		L	B-Li	4	A	Spic	W	Timk	8.8:1	30.37:1		36x6	40x6†	Ross	190		Smi		85							
White 45	7925	5000	Own	4¼x5¾	28.9	L	C	T	F	Own	V	Mag		D	Selec	4	U	Own	R	Own				36x6	40x6†	Own	174	Own			70							
Wilcox W	9000		Wau	4¾x6¾	36.1	L	C	T	S		V			C	Selec	4	A	Spic	W	½-Fl	42.1:1	8.7:1	Shel	36x5	40x12	Gem	162		Smi									
Wilson H	7500	5275	Own	4½x5½	32.4	L	C	T	B	Mar	G	Eis		B	B-Li	4	A	K-B	W	Timk	10.25:1	49.61:1	Per	36x6	40x6†	Ross	160	Pier	Smi		80							
Winther 100	8300	5250	Wis	4½x6	32.4	L	C	T	G	Mas	V	Eis	B	B	B-Li	4	A	Bld	I	Cl	12.5:1	60.5:1	Math	36x5	40x6†	Ross	162	Dup	Cla		80							

5½, 6 and 7 Ton

5½, 6 and 7 Ton

Doane 1919	8500		Wau	4¾x6¾	36.1	L	C	C	S	Mas	G	Bos		D	Selec	3	U		C	Dead	10.6:1			36x6	40x6†	Lav	178	Wau	West		79							
Hall	7530	5100	Cont	4½x5½	32.4	L	P	Own	B	Zen	G	Bos			B-Li		U	Opt	C	Timk	12:1		Det	36x5	40x6†	Gem	Q	Dup	Smi									
Garford 69	9350		Wis	5.1x5½	41.6	T	C	T	F	Rayf	G	Eis			Selec	4		Spic	C	Dead	11.4:1		Per	36x6	40x7†	Ross	128	Simp	Smi									
Kelly-Springfield K60	9500	5500	Own	4½x6½	32.4	T	C	Fed	F	Rayf	G	Eis	W	C	Covt	3	A	Spic	C	Dead	12.39:1	45.2:1	Per	36x6	40x7†	Gem	150	Own	StM		23							
Maccar G1	8750	5500	Wis	5 x6	40	L	C	C	B	Zen	G	Eis		L	B-Li	4	A	Spic	W	Timk	10.25:1	49.61:1	Mer	36x5	40x6†	Ross	186	Pier	Day	Fir	70							
Packard G., E	8925	5700	Own	5 x5½	40	L	C	T	F	Own	P	Dix	B	D	Selec	4	A	Spic	W	Flot	10.66	49		36x6	40x7	Own	156	Own			58.5							
Royal 6			Wis	4¾x6	42		C	T		Strm		Bos	Q		Own			Own	W	Timk			Mer	36x6	40x6†	Ross	168	Mon										

5½, 6 and 7 Ton—Continued

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
Tiffin 4	9000	5450	Cont	5 x6	33.8	L	C	T	B	Sheb	G	Bos	W	D	Covt	3	A	Acme	W	Shel	10.25:1	60.7:1	Kal	36x6	40x12	Ross	168	.....	Smi	Gdy	80
Mack AC	8672	5750	Own	5 x6	40	L	C	Own	S	Zen	G	Aer	...	O	Own	3	UJ	Spic	C	OwnD	10.5	33.7	Mer	36x6	40x12	Gem	Q	Own	Sch	.....	73
Winther 140	9600	5900	Wis	5 x6	40	L	C	T	G	Mas	V	Eis	B	B	B-Li	4	A	Bld	I	Cl	12.5:1	60.5:1	Math	36x6	40x7	Ross	162	Dup	Cla	.....	80
Couple Gear LD-6	12000	7450	Wis	5¼x7	44.1	T	G	H	F	Strm	G	Eis	O	...	Own	5	....	Own	B	Own	12:1	.....	Tut	36x5†	36x6	Own	144	.....	Own	Own	65
Mack AC	9050	6000	Own	5 x6	40	L	C	Own	S	Zen	G	Aer	...	O	Own	3	UJ	Spic	C	Own D	11.58	37.16	Mer	36x7	40x7†	Gem	Q	Own	Sch	.....	73
Old Reliable K,L,M	10240	6250	Wau	4¾x6¾	36.1	L	C	T	B	Strm	G	Bos	...	W	D-Sea	4	A	Spic	C	Shel	10.86:1	54.9:1	Shel	36x6	40x7†	Ross	136	Wau	Smi	.....	78
Available H7	10300	6000	Wau	5x6¼	40	L	C	Chic	B	Strm	V	Bos	...	L	B-Li	4	A	Spic	R	Sav	12:1	5.7:1	S-El	36x6	40x14	Ross	190	Wau	Smi	.....	90
Royal 7	.....	.....	Wis	5¼x7	44.1	...	C	T	...	Strm	...	Bos	Q	...	Own	..	A	.....	W	Timk	.....	.....	Mer	36x7	40x7†	Ross	168	Mon	.....	.....	.....
Sterling 7½-Chain	11000	6500	Ster	5x6¼	40	L	C	Own	...	Rayf	V	Eis	...	M	Own	6	A	UM	C	Own	7.26:1	43.6:1	Math	36x6	40x7†	Ross	174	Wau	Pru	.....	91
Wichita S	9200	5000	Beav	4½x6	32.4	I	P	EM	C	Strm	G	Ber	...	C	Own	4	A	Own	...	Own	14:1	66.2:1	.....	36x6	40x6†	Ross	165	Dup	Smi	.....	90

5½, 6 and 7 Ton—Continued

Gasoline Tractor-Trucks

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
Columbia GT	4200	2850	Hink	4 x5¼	25.6	L	C	T	B	Strm	...	Bos	....	D	Cott	4	A	Spic	I	Russ	9.5:1	.....	Per	36x4	36x7	Own	112	Hink	Det	Fir	80
Federal Light Duty	4700	3050	Cont	4½x5¼	27.2	L	C	T	B	Zen	G	Eis	...	B	Own	4	A	Spic	W	Timk	9.25:1	40.7:1	Math	36x4	36x7	Gem	110	Phar	.....	Fir	....
Federal Heavy Duty	6800	4025	Cont	4½x5½	32.4	L	C	T	B	Zen	G	Eis	...	B	Own	4	A	Spic	W	Timk	12:1	59.88:1	Math	36x5	36x5†	Gem	114	Phar	.....	Fir	....
Garford 70HT	4750	....	Buda	4¼x5½	28.9	L	C	T	F	Strm	G	Spl	...	L	Selec	4	....	Spic	W	Timk	.....	.....	Per	36x4	36x7	Ross	119	Simp	.....	.....	....
Garford 77CT	7200	....	Wis	4¾x5½	36.1	T	C	T	F	Rayf	G	Eis	...	L	Selec	4	....	Spic	W	Timk	.....	.....	Per	36x5	40x5†	Ross	105	Simp	Smi	.....	....
Garford 68T	8450	....	Wis	5.1x5½	41.6	T	C	T	F	Rayf	G	Eis	...	L	Selec	4	....	Spic	C	Dead	.....	.....	Per	36x6	40x6†	Ross	102	Simp	Smi	.....	....
Hewitt-Ludlow 6-Ton	4000	....	Buda	4¼x5½	28.9	...	..	T	F	Strm	...	Bos	...	B	.....	..	....	Spic	C	.....	.....	.....	.....	36x5	36x4†	Lav	...	.....	.....	.....	....
Hood	2900	1425	Own	3¾x3¾	22.5	T	C	Idl	S	Holl	G	Mag	...	D	Plan	2	U	Own	C	Own	8:1	24:1	Lah	20x3½	20x5	Own	60	.....	Own	.....	65
Jumbo C	4450	3095	Buda	4¼x5½	28.9	L	C	GO	F	Zen	G	Eis	Q	F	Full	3	U	Arv	I	Cl	9:1	4.84:1	Det	36x4	36x7	Jac	152	Dup	Day	.....	60
Knox 35	8500	6000	Own	5 x5½	40	I	C	Fed	F	Zen	V	Mag	G	D	Selec	3	A	.....	W	Timk	1:.08	1:.0145	.....	36x4	38x6†	Ross	108	.....	Wan	.....	60
Knox 36 3-Ton	10000	6500	Own	5 x5½	40	I	C	Fed	F	Zen	V	Mag	G	D	Selec	3	A	.....	W	Timk	1:.08	1:.0145	.....	36x4	38x6†	Ross	108	.....	Wan	.....	....
Koehler MT	4750	3450	Her	4 x5½	25.6	L	C	T	P	Zen	G	Eis	...	D	B-Li	4	A	Spic	W	Timk	9.25:1	37:1	Math	36x4	36x7	Lav	142	Simp	Wan	SAE	....
Kuhn	9000	....	Wis	4¼x5½	28.9	T	C	H	S	Rayf	...	Bos	...	C	Selec	4	....	.....	B	Own	.....	.....	.....	36x7	36x7	.....	138	.....	.....	.....	....
Lombard	8000	.....	Spec 6	5½x6¾	72.7	...	C	Spec	F	Sheb	P	.....	...	D	Spec	..	A	.....	W	.....	.....	.....	.....	.....	.....	Spec	...	.....	.....	.....	90
Mack AB 5-Ton	4940	3400	Own	4 x5	25.6	L	C	Own	S	Zen	G	Aer	...	L	B-Li	4	U	Bld	C	Own	10.53	42.27	Mer	36x4	36x4†	Gem	120	Own	Sch	.....	....
Mack AC 7-Ton	7670	4950	Own	5 x6	40	L	C	Own	S	Zen	G	Aer	...	O	Own	3	UJ	Spic	C	Own D	10.76	34.60	Mer	36x5	40x5†	Gem	119	Own	Sch	.....	....
Mack AC 10-Ton	8250	5500	Own	5 x6	40	L	C	Own	S	Zen	G	Aer	...	O	Own	3	UJ	Spic	C	Own D	11.58	37.16	Mer	36x6	40x6†	Gem	119	Own	Sch	.....	....
Mack AC 13-Ton	8272	5750	Own	5 x6	40	L	C	Own	S	.....	G	Aer	...	O	Own	3	UJ	Spic	C	Own D	12.92	41.5	Mer	36x6	40x12	Gem	119	Own	Sch	.....	....
Mack AC 15-Ton	8650	6000	Own	5 x6	40	L	C	Own	S	Zen	G	Aer	...	O	Own	3	UJ	Spic	C	Own D	14.10	45.26	Mer	36x7	40x7†	Gem	119	Own	Sch	.....	....
Master T	4500	3050	Buda	4¼x5½	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	Spic	I	Torb	8:1	32:1	Det	34x4	36x4†	Ross	110	McC	Pru	.....	76
Rennoc 8-Ton	5050	....	Buda	4½x5½	27.2	L	C	T	F	Strm	...	Spl	...	D	Warn	4	....	Hart	W	Wis	.....	.....	Row	36x5	36x7	Lav	116	Pier	.....	.....	60
Watson	6500	4050	Cont	4½x5½	32.4	L	P	Jam	B	Strm	G	Bos	...	...	B-Li	4	A	Spic	W	Timk	.....	.....	Shel	34x4	36x5	Gem	80	Pier	.....	.....	37

Gasoline Tractor-Trucks

Electric Commercial Cars

E. C. M. Name and Model Number	Carrying Capacity	Chassis Weight	Chassis Price	Maximum Speed	Battery	Mileage Per Charge	Motor	Controller	Speeds Forward	Drive	Rear Axle	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Pr. Cent of Weight on Rear Wheels
Ward WS	750	1400	.....	12	Edis	45	G-E	Own	4	W	Shel	Shel	32x2½	32x3	Own	88	60
C-T ½	1000	1800	1900	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3	36x3	W	89¼	60
Walker M	1000	2300	.....	15	Opt	60	West	West	5	O	Own	Math	34x3	36x3½	Ross	93	66
Atlantic 1C	2000	2770	.....	12	Opt	.....	G-E	G-E	4	C	Timk	S-El	34x4	36x4	Ross	103	65
Ward WA	1250	2730	.....	12	Edis	47	G-E	G-E	4	W	Shel	Shel	32x3	34x3½	Own	90	60
C-T 1	2000	2500	2300	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3½	36x4	W	101	60
Walker K	2000	2700	.....	14	Opt	60	West	West	5	O	Own	Math	34x3½	36x4	Ross	96	66
Ward WB	2000	3430	.....	10	Edis	43	G-E	G-E	4	W	Shel	Shel	34x3½	36x4	Own	102	60
Atlantic 2C	4000	3590	.....	11	Opt	.....	G-E	G-E	4	C	Timk	S-El	34x4	36x3†	Ross	115	65
C-T 2	4000	3500	2700	12	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x4	36x4†	W	116	60
Walker L	4000	3800	.....	13	Opt	60	West	West	5	O	Own	Math	38x4	38x6	Ross	112	66
Ward WD	4000	4500	.....	8.5	Edis	35	G-E	G-E	4	W	Shel	Shel	36x4	36x7	Own	114	60
Atlantic 3C	7000	5220	.....	10	Opt	.....	G-E	G-E	5	C	Timk	.....	36x5	40x5†	Ross	135	65
C-T 3½	7000	5000	3900	11	Opt	50	G-E	Own	4	I	Dead	Shel	36x6†	36x4†	W	122	55
Ward WF	7000	6600	.....	7	Edis	30	G-E	G-E	4	W	Shel	Shel	36x5	36x8	Own	132	60
Atlantic 5C	10000	6230	.....	9	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x5†	Ross	144	65
Couple Gear H	7000	9000	.....	10	Phil	30	Own	Own	5	B	Own	Tut	36x5†	36x5†	Own	96	55
Couple Gear	10000	10000	.....	7	Phil	30	Own	Own	5	B	Own	Tut	36x5†	36x5†	Own	96	75
C-T 5	10000	6000	4400	10	Opt	50	G-E	Own	4	I	Dead	Shel	36x7	36x5†	W	132	55
Walker P	7000	5600	.....	11	Opt	50	West	West	5	O	Own	Math	36x5	38x5†	Ross	131	66
Walker N	10000	6400	.....	10	Opt	50	West	West	5	O	Own	Math	36x6	38x6†	Ross	141	66
Ward WH	10000	8375	.....	6	Edis	26	G-E	G-E	4	W	Shel	Shel	36x7	40x10	Own	144	60
Atlantic 6C	13000	6940	.....	8	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x6	Ross	156	55
Couple Gear	14000	11000	.....	10	Phil	30	Own	Own	5	B	Own	Tut	36x5†	36x5	Own	96	55

Electric Commercial Cars

Manufacturers Whose Models Are Included in Specifications on Preceding Pages

Acason—Acason Motor Truck Co., Detroit, Mich.
Ace—American Motor Truck Co., Newark, Ohio.
Acme—Acme Motor Truck Co., Cadillac, Mich.
All-American—All-American Truck Co., Chicago, Ill.
Apex—Hamilton Motor Co., Grand Haven, Mich.
Armleder—O. Armleder Co., Cincinnati, Ohio.
Atlantic—Atlantic Electric Vehicle Co., Newark, N. J.
Atlas—Martin-Parry Corp., York, Pa.
Atterbury—Atterbury Motor Car Co., Buffalo, N. Y.
Autocar—Autocar Co., Ardmore, Pa.
Available—Available Truck Co., Chicago, Ill.

Beck-Hawkeye—Beck-Hawkeye Motor Truck Works, Cedar Rapids, Iowa.
Bell—Iowa Motor Truck Co., Ottumwa, Ia.
Belmont—Belmont Motors Corp., Lewistown, Pa.
Bessemer—Bessemer Motor Truck Co., Grove City, Pa.
Bethlehem—Bethlehem Motor Truck Corp., Allentown, Pa.
Betz—Betz Motor Truck Co., Hammond, Ind.
Birch—Birch Motor Cars, Chicago, Ill.
Brinton—Brinton Motor Truck Co., Philadelphia, Pa.
Brockway—Brockway Motor Truck Co., Cortland, N. Y.

C. T.—Commercial Truck Co. of America, Philadelphia, Pa.
Capitol—Capitol Motors Corp., Fall River, Mass.
Chevrolet—Chevrolet Motor Co. of Mich., Flint, Mich.
Chicago—Chicago Motor Truck, Inc., Chicago, Ill.
Clydesdale—Clydesdale Motor Truck Co., Clyde, Ohio.
Collier—Collier Motor Truck Co., Bellevue, Ohio.
Columbia—Columbia Motor Truck & Trailer Co., Pontiac, Mich.
Comet—Comet Automobile Co., 156 S. Water St., Decatur, Ill.
Commerce—Commerce Motor Car Co., Detroit, Mich.
Concord—Abbot-Downing Truck & Body Co., Concord, N. H.
Conestoga—Conestoga Motor Truck Co., Lancaster, Pa.
Corbitt—Corbitt Motor Truck Co., Henderson, N. C.
Couple Gear—Couple Gear Freight Wheel Co.., Grand Rapids, Mich.

Dart—Dart Truck & Tractor Corp., Waterloo, Ia.
Day-Elder—Day-Elder Motors Corp., Newark, N. J.
Dearborn—Dearborn Truck Co., Chicago, Ill.
Defiance—Defiance Motor Truck Co., Defiance, Ohio.
DeKalb—DeKalb Wagon Co., DeKalb, Ill.
Denby—Denby Motor Truck Co., Detroit, Mich.
Dependable—Dependable Truck & Tractor Co., Galesburg, Ill.
Diamond T—Diamond T Motor Car Co., Chicago, Ill.
Diehl—Diehl Motor Truck Works, Philadelphia, Pa.
Dispatch—Dispatch Motor Car Co., Minneapolis, Minn.
Doane—Doane Motor Truck Co., San Francisco, Cal.
Dodge—Dodge Bros., Detroit, Mich.
Dorris—Dorris Motor Car Co., St. Louis, Mo.
Double Drive—Double Drive Truck Co., Chicago, Ill.
Douglas—Douglas Motors Corp., Omaha, Nebr.
Duplex—Duplex Truck Co., Lansing, Mich.
Duty—Duty Motor Co., Greenville, Ill.

Eagle—Eagle Motor Truck Corp., St. Louis, Mo.
Ellsworth—Mills-Ellsworth Co., Keokuk, Ia.
Elmira—Elmira Commercial Motor Car Co., Inc., Owego, N. Y.
Erie—Erie Motor Truck Mfg. Co., Erie, Pa.

F. W. D.—Four Wheel Drive Auto Co., Clintonville, Wis.
Fageol—Fageol Motors Co., Oakland, Cal.
Famous—Famous Trucks, Inc., St. Joseph, Mich.
Fargo—Fargo Motor Truck Co., Chicago, Ill.
Federal—Federal Motor Truck Co., Detroit, Mich.
Ford—Ford Motor Co., Highland Park, Mich.
Forschler—Forschler Motor Truck Mfg. Co., New Orleans, La.
Front Drive—Double Drive Truck Co., Chicago, Ill.
Fulton—Fulton Motors Corp., New York, N. Y.

G. M. C.—General Motors Truck Co., Pontiac, Mich.
Garford—Garford Motor Truck Co., Lima, Ohio.
Gary—Gary Motor Truck Co., Gary, Ind.
Gersix—Gersix Mfg. Co., Seattle, Wash.
Giant—Giant Truck Corp., Chicago Heights, Ill.
Graham—Graham Brothers, Evansville, Ind.
Gramm-Bernstein—Gramm-Bernstein Motor Truck Co., Lima, Ohio.
Grant—Grant Motor Car Corp., Truck Division, Cleveland, Ohio.

Hahn—Hahn Motor Truck & Wagon Co., Hamburg, Pa.
Hall—Lewis-Hall Motors Corp., Detroit, Mich.
Harvey—Harvey Motor Truck Co., Detroit, Mich.
Hawkeye—Hawkeye Truck Co., Sioux City, Ia.
Hendrickson—Hendrickson Motor Truck Co., Chicago, Ill.
Hewitt-Ludlow—Ralston Iron Works, San Francisco, Cal.
Highway-Knight—Highway Motors Co., Chicago, Ill.
Higrade—Higrade Motors Co., Harbor Springs, Mich.
H & M—H & M Motor Truck Co., Inc., Baltimore, Md.
Hood—Hood Mfg. Co., Seattle, Wash.
Hoover—Hoover Wagon Co., York, Pa.
H. R. L.—H. R. L. Motor Co., Seattle, Wash.
Huffman—Huffman Bros. Co., Elkhart, Ind.
Hurlburt—Hurlburt Motors, Inc., New York, N. Y.

Independent—Independent Motor Co., Youngstown, O.
Independent—Independent Motor Truck Co., Inc., Davenport, Ia.
Indiana—Indiana Truck Corp., Marion, Ind.
International—International Harvester Co., Chicago, Ill.

Jackson—Jackson Motors Corp., Jackson, Mich.
Jones—Jones Motor Car Co., Wichita, Kans.
Jumbo—Nelson Motor Truck Co., Saginaw, Mich.

Kalamazoo—Kalamazoo Motor Corp., Kalamazoo, Mich.
Kankakee—Kankakee Automobile Co., Kankakee, Ill.
Karavan—Caravan Motors Co., Portland, Ore.
Kearns—Kearns-Dughie Motors Co., Beavertown, Pa.
Keldon—House Cold Tire Setter Co., St. Louis, Mo.
Kelly-Springfield—Kelly-Springfield Motor Truck Co., Springfield, Ohio.
Keystone—Keystone Motor Truck Corp., Philadelphia, Pa.
Kimball—Kimball Motor Truck Co., Los Angeles, Cal.
King Zeitler—King Zeitler Co., Chicago, Ill.
Kissel—Kissel Motor Car Co., Hartford, Cal.
Kleiber—Kleiber & Co., Inc., San Francisco, Cal.

Knox—Knox Motors Co., Springfield, Mass.
Koehler—H. J. Koehler Motors Corp., Newark, N. J:
Kuhn—Kuhn Tractor Truck Co., Seattle, Wash.

Lange—Lange Motor Truck Co., Pittsburgh, Pa.
Larrabee-Deyo—Larrabee-Deyo Motor Truck Co., Inc., Binghamton, N. Y.
L. M. C.—Louisiana Motor Car Co., Shreveport, La.
Lombard—Lombard Auto Tractor Truck Corp., New York, N. Y.
Lone Star—Lone Star Truck & Tractor Assn., San Antonio, Texas.
Luedinghaus—Luedinghaus-Espenschied Wagon Co., St. Louis, Mo.
Luverne—Luverne Automobile Co., Luverne, Minn.

Maccar—Maccar Truck Co., Scranton, Pa.
Mack—International Motor Co., New York, N. Y.
Marshall—Marshall Mfg. Co., Chicago, Ill.
Master—Master Trucks, Inc., Chicago, Ill.
Maxwell—Maxwell Motor Co., Inc., Detroit, Mich.
Menominee—Menominee Motor Truck Co., Menominee, Mich.
Moreland—Moreland Motor Truck Co., Los Angeles, Cal.
Muskegon—Muskegon Engine Co., Muskegon, Mich.
Mutual—Mutual Truck Co., Sullivan, Ind.

Napoleon—Napoleon Motors Co., Traverse City, Mich.
Nash—Nash Motors Co., Kenosha, Wis.
Nelson-LeMoon—Nelson & LeMoon, Chicago, Ill.
Netco—New England Truck Co., Fitchburg, Mass.
Niles—Niles Motor Truck Co., Pittsburgh, Pa.
Noble—Noble Motor Truck Co., Kendallville, Ind.
Northway—Northway Motors Co., Natick, Mass.
Northwestern—Starr Carriage Co., Seattle, Wash.
Norwalk—Norwalk Motor Car Co., Martinsburg, W. Va.

O. K.—Oklahoma Auto Mfg. Co., North Muskogee, Okla.
Ogden—Ogden Motor & Supply Co., Chicago, Ill.
Old Hickory—Kentucky Wagon Mfg. Co., Louisville, Ky.
Old Reliable—Old Reliable Motor Truck Co., Chicago, Ill.
Oldsmobile—Olds Motor Works, Lansing, Mich.
Oneida—Oneida Motor Truck Co., Green Bay, Wis.
Oshkosh—Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.

Packard—Packard Motor Car Co., Detroit, Mich.
Paige—Paige-Detroit Motor Car Co., Detroit,, Mich.
Parker—Parker Motor Truck Co., Milwaukee, Wis.
Patriot—Patriot Motors Co., Lincoln, Neb.
Pierce-Arrow—Pierce-Arrow Motor Car Co., Buffalo, N. Y..
Pioneer—Pioneer Motor Truck Co., Detroit, Mich.
Pioneer—Pioneer Truck Co., Chicago, Ill.
Pittsburgher—Pittsburgh Truck Mfg. Co., Pittsburgh, Pa.
Pony—Minnesota Machinery & Foundry Co., Minneapolis, Minn.

Rainier—Rainier Motor Corp., Flushing, L. I., N. Y.
Reliance—Reliance Motor Truck Co., Appleton, Wis.
Rennoc—Rennoc-Leslie Motor Co., Philadelphia, Pa.
Reo—Reo Motor Car Co., Lansing, Mich.
Republic—Republic Motor Truck Co., Inc., Alma, Mich.
Reynolds—Reynolds Motor Truck Co., Mt. Clemens, Mich.
Riker—Locomobile Co. of America, Bridgeport, Conn.
Rowe—Rowe Motor Mfg. Co., Lancaster, Pa.
Royal—Royal Motor Truck of N. Y., New York, N. Y.

Sandow—Sandow Motor Truck Co., Chicago, Ill.
Sanford—Sanford Motor Truck Co., Syracuse, N. Y.
Schacht—G. A. Schacht Motor Truck Co., Cincinnati, O.
Schwartz—Schwartz Motor Truck Co., Reading, Pa.
Selden—Selden Truck Corp., Rochester, N. Y.
Service—Service Motor Truck Co., Wabash, Ind.
Shaw—Walden W. Shaw Livery Co., Chicago, Ill.
Signal—Signal Motor Truck Co., Detroit, Mich.
Southern—Southern Truck & Car Corp., Greenboro, N. C.
Spacke—Spacke Machine & Tool Co., Indianapolis, Ind.
Standard—Standard Motor Truck Co., Detroit, Mich.
Sterling—Sterling Motor Truck Co., Milwaukee, Wis.
Stewart—Stewart Motor Corp., Buffalo, N. Y.
Stoughton—Stoughton Wagon Co., Stoughton, Wis.
Success—Webberville Truck Co., Webberville, Mich.
Sullivan—Sullivan Motor Truck Co., Atlanta, Ga.
Superior—Superior Motor Truck Co., Atlanta, Ga.

Texan—Texas Motor Car Asso., Fort Worth, Texas.
Tiffin—Tiffin Wagon Co., Tiffin, Ohio.
Titan—Titan Truck Co., Milwaukee, Wis.
Tower—Tower Motor Truck Co., Greenville, Mich.
Traffic—Traffic Motor Truck Corp., St. Louis, Mo.
Transport—Transport Truck Co., Mt. Pleasant, Mich. .
Traylor—Traylor Eng. & Mfg. Co., Cornwells, Pa.
Triangle—Triangle Motor Truck Co., St. Johns, Mich.
Triumph—Triumph Truck & Tractor Co., Kansas City, Mo.
Twin City F. W. D.—Twin City Four Wheel Drive Co., Inc., St. Paul, Minn.
Twin City—Minneapolis Steel & Mach. Co., Minneapolis, Minn.

Ultimate—Vreeland Motor Co., Inc., Newark, N. J.
Union—Union Motor Truck Co., Bay City, Mich.
United—United Motors Co., Grand Rapids, Mich.
U. S.—United States Motor Truck Co., Cincinnati, Ohio.

Velie—Velie Motors Corp., Moline, Ill.
Victor—Victor Motor Truck & Trailer Co., Chicago, Ill.
Vim—Vim Motor Truck Co., Philadelphia, Pa.

Walker—Walker Vehicle Co., Chicago, Ill.
Walker-Johnson—Walker-Johnson Truck Co., Woburn, Mass.
Walter—Walter Motor Truck Co., New York, N. Y.
Ward—Ward Motor Vehicle Co., Mt. Vernon, N. Y.
Ward La France—Ward La France Truck Co., Inc., Elmira, N. Y.
Watson—Watson Wagon Co., Canastota, N. Y. .
Wells—Evans Truck & Axle Co., Auburn, Ind.
White—White Co., Cleveland, Ohio.
White Hickory—White Hickory Motor Corp., Atlanta, Ga.
Wichita—Wichita Falls Motor Co., Wichita Falls, Tex.
Wilcox—H. E. Wilcox Motor Co., Minneapolis, Minn.
Wilson—J. C. Wilson Co., Detroit, Mich.
Winther—Winther Motor Truck Co., Kenosha, Wis.
Witt-Will—Witt-Will Co., Inc., Washington, D. C.
Wolverine—American Commercial Car Co., Detroit, Mich.

Price List, Maximum Capacities and Inflation Pressures of Large Size Pneumatic Tire Casings

	36 x 6			38 x 7			40 x 8			42 x 9			44 x 10		
	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure
Amazon Rubber Co., Akron, O.															
Amazon Cord, non-skid	123.85	2000	106	.....	....	...	.....	....	...	.....	....	...	.....	....	...
American Rubber & Tire Co., Akron, O.															
Americord, non-skid	117.75	....	...	166.00	....	...	213.85	....	...	.....	....	...	.....	....	...
Bergougnan Rubber Corp., Trenton, N. J.															
Bergougnan Cord, non-skid	141.10	2000	90	184.55	2700	100	239.10	3650	110	.....	....	...	.....	....	...
Braender Rubber & Tire Co., Rutherford, N. J.															
Braender Super Cord, non-skid	132.50	....	...	187.35	....	...	241.40	....	...	.....	....	...	.....	....	...
Brunswick-Balke-Collander Co., Chicago, Ill.															
Brunswick Cord, Skid-Not	128.90	....	95	182.30	....	105	234.85	....	115	.....	....	...	.....	....	...
Curtis Tire & Rubber Co., Muskegon, Mich.															
Curtis Cord, Road	119.35	2200	90	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Empire Tire & Rubber Co., Trenton, N. J.															
Empire Cord, non-skid	119.35	2000	90	168.80	2700	100	217.45	3650	110	.....	....	...	.....	....	...
Falls Rubber Co., Cuyahoga Falls, O.															
Falls Cord, Neverslip	140.00	2200	90	180.00	3000	100	230.00	4000	110	.....	....	...	.....	....	...
Federal Rubber Co. of Ill., Cudahy, Wis.															
Federal Cord, non-skid	119.35	2300	90	168.80	3000	100	217.45	4000	110	.....	....	...	.....	....	...
Firestone Tire & Rubber Co., Akron, O.															
Firestone Cord, non-skid	119.35	2200	90	168.80	3000	100	217.45	4000	110	272.35	5000	120	380.65	6000	130
Fisk Rubber Co., Chicopee Falls, Mass.															
Fisk Cord, non-skid	119.35	2200	90	168.80	3000	100	217.45	4000	110	272.35	5000	120	380.65	6000	130
General Tire & Rubber Co., Akron, O.															
General Cord, non-skid	130.85	2200	90	185.15	3000	100	238.50	4000	110	298.65	5000	120	417.45	6000	130
Goodrich, B. F. Rubber Co., Akron, O.															
Goodrich Cord, Ribbed	119.35	2200	90	168.80	3000	100	217.45	4000	110	.....	....	...	.....	....	...
Goodrich Cord, Safety	119.35	2200	90	168.80	3000	100	217.45	4000	110	.....	....	...	.....	....	...
Goodyear Tire & Rubber Co., Akron, O.															
Goodyear Cord, Ribbed	119.35	2200	100	168.80	3000	110	217.45	4000	120	.....	....	...	.....	....	...
Goodyear Cord, All-Weather	119.35	2200	100	168.80	3000	110	217.45	4000	120	272.35	5000	130	380.65	6000	140
Hewitt Rubber Co., Buffalo, N. Y.															
Hewitt Cord, non-skid	132.60	2000	90	187.50	2850	100	.....	....	...	.....	....	...	.....	....	...
Howe Rubber Co., Inc., New Brunswick, N. J.															
Howe Ultra Cord, non-skid	127.25	2000	90	.....	....	...	.....	....	...	.....	....	...	.....	....	...
India Tire & Rubber Co., Akron, O.															
India Cord, non-skid	108.30	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
International India Rubber Corp., South Bend, Ind.															
Odell Cord, rough	119.35	2000	90	168.80	2700	100	.....	....	...	.....	....	...	.....	....	...
Kelly-Springfield Tire Co., Cleveland, O.															
Kelly-Springfield Cord, grooved	140.00	....	...	188.00	....	...	236.00	....	...	.....	....	...	.....	....	...
Kelly-Springfield Cord, BB	140.00	....	...	188.00	....	...	236.00	....	...	.....	....	...	.....	....	...
McGraw Tire & Rubber Co., Cleveland, O.															
McGraw Cord, ribbed	131.25	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
McGraw Cord, non-skid	131.25	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Marathon Tire & Rubber Co., Cuyahoga Falls, O.															
Marathon Cord, Angle	120.00	2200	100	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Mason Tire & Rubber Co., Kent, O.															
Mason Cord, non-skid	119.35	2200	90	156.10	3000	100	216.40	3750	100	.....	....	...	.....	....	...
Miller Rubber Co., Akron, O.															
Miller Cord, Geared-to-the-Road	126.65	2200	90	177.65	3000	100	228.90	4000	110	.....	....	...	.....	....	...
Mohawk Rubber Co., Akron, O.															
Mohawk Cord, non-skid	136.00	2200	90	180.00	3000	100	240.00	4000	110	.....	....	...	.....	....	...
Norwalk Tire & Rubber Co., Norwalk, Conn.															
Norwalk Cord, non-skid	125.20	2000	90	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Oldfield Tire Co., Cleveland, O.															
Oldfield Cord, anti-skid	125.30	2200	90	177.25	3000	100	228.30	3725	100	.....	....	...	.....	....	...
Pennsylvania Rubber Co., Jeannette, Pa.															
Vacuum Cup Cord	108.40	2200	90	153.35	3000	100	197.60	4000	110	.....	....	...	.....	....	...
Perfection Tire & Rubber Co., Fort Madison, Ia.	119.35	2000	90	168.80	2700	100	217.40	3650	110	.....	....	...	.....	....	...
Portage Rubber Co., Barberton, O.															
Portage Cord, Daisy	132.00	....	...	176.00	....	...	.....	....	...	.....	....	...	.....	....	...
Racine Rubber Co., Racine, Wis.															
Racine Multi Mile Cord, non-skid	117.85	2200	90	166.65	3000	100	214.75	4000	110	.....	....	...	.....	....	...
Republic Rubber Co., Youngstown, O.															
Republic Grande Cord, Staggard Tread	129.00	2200	90	182.45	3000	100	235.05	4000	110	.....	....	...	.....	....	...
Star Rubber Co., Akron, O.															
Star Cord, "All Star"	144.00	2200	90	192.00	3000	100	240.00	4000	110	.....	....	...	.....	....	...
Swinehart Tire & Rubber Co., Akron, O.															
Swinehart Cord, Hexagon	119.35	2000	90	.....	....	...	.....	....	...	.....	....	...	.....	....	...
United States Tire Co. New York City.															
U. S. Nobby Cord	119.35	2200	90	168.80	3000	100	217.45		110	272.35	5000	120	380.65	6000	130

Will German Cars Come to America?

Inability of foreign automobile factories to get into the swing of production has forced a great number of dealers to come to America for trucks and passenger cars. One of the most important single transactions recorded during the past few weeks is that consummated by Igal V. Roper, sales manager for Jameson-Foster, Ltd., South Shields, England. Roper returned to his country after contracting for over $3,000,000 worth of trucks and passenger cars to be delivered as quickly as possible. Included in this purchase are 1000 one-ton trucks from the Atlas Truck Corporation as an initial order from this new English distributor of Atlas Trucks. Roper stated that with all restrictions removed the German factories would put up a good fight to get into British and American markets with passenger cars and trucks and that because of depreciated currency the vehicles would be attractive to buyers in those countries. At the present time, he stated, English factories are producing as much as they can, but are far from supplying half the demand. It is therefore necessary for those desiring to supply all customers with the same make of car to go to America, where quantity purchases may be made and where quantity delivery can be assured.

A bill has been presented in the Louisiana legislature creating a bond issue of $35,000,000 for an all-year-round, all-state highway system.

Grocers Increase Tire Sales

Throughout the South tire sales by wholesale grocery firms are increasing rapidly, and one grocery concern has found this business so profitable that automobile equipment and merchandise will be added to the tires. The Albert Mackie Co., Ltd., New Orleans, report that several excellent branches have been extended through retail grocers in Louisiana and Mississippi.

Howard L. Spohn of the Class Journal Publications, and **Frank A. Kapp**, of the Associated Blue Book Publications have joined the Charles H. Fuller Company, advertising agents, Chicago.

Diamond T Direct Mail Consumer Advertising Campaign

At the recent conference of the Direct Mail Advertising Association held at Chicago, Alexander Gray, Mgr., of Sales Promotion of the Diamond T Motor Car Company explained the method by which the Diamond T Company has been educating the prospective owner and how they succeeded in converting "the future time" prospect into a "present time" one.

Incidentally, it may be mentioned that the Diamond T Motor Car Company entered its direct mail consumer campaign in the contest promoted by the Addressograph Company and was awarded third prize. The Chairman of the judging committee, Prof. G. B. Hotchkiss, head of the department of advertising and marketing of the New York University, complimented the Diamond T Company on the merits of its campaign and asked that the copy of this campaign be given to the University, so that the students in the field of mail selling may have an opportunity to examine it.

The accompanying illustration shows the front cover pages of some of the literature used in the Diamond T mail campaign. Two of the pieces of literature that are especially significant are the booklets entitled "The Famous Drive That Came From a Famous Gun" and "This Early Bird Got the Worm." Both booklets contain real information of interest to the motor truck owner or prospective buyers. The former explains the "Hotchkiss Drive" principle while the latter concerns the worm drive.

A. Gray Draws Comparisons

"The motor truck industry today stands just about where the passenger car industry stood ten years ago. Then there were 600,000 passenger cars in operation. Today, there are seven and a half million. Today there are 734,000 motor trucks in operation, and we are estimating that in 1930, we will have six and a half million motor trucks operating.

The passenger car manufacturer has never had a very difficult selling problem to face. On the other hand, the motor truck manufacturer has a real selling problem. With over 200 manufacturers building trucks, competition is naturally very keen.

The prospective buyer of a truck must first be convinced of the fact that the motor trucks should be used in his business, even though they cost more to operate per day than horse and wagon. Then—granting that he needs a truck—he must decide upon the type. Finally, he must decide upon capacity and make.

The Prospect Must be Educated

"He cannot learn all of these things from manufacturers' advertisements, or even from their catalogues. So he expects to get this from the manufacturer's nearest representative, the dealer or distributor. He must be educated—and there are many prospects like him in almost every community. But nine times out of ten the dealer is not taking an interest in educating such prospects, for his list consists of only those persons or firms interested in purchasing a truck.

It is true that a dealer generally devotes the major part of his sales effort to securing the order of a person known to be in the market. It is also true that his competitors are doing precisely the same thing. Hence, it follows as self-evident that the gates are down and road practically clear for a wide-awake dealer to do very effective work in sales promotion and development by getting after people who may not be in the market, at the present moment, but who are, logically, candidates for purchase at a future time.

The right kind of work will, in a substantial number of cases, convert the 'future time' into 'present time'!"

Mr. Gray then gave a detailed account of the direct-by-mail campaign conducted by his company. In telling of the various booklets, cards, etc., sent out, he said:

"Now you doubtless have heard arguments as to the assembled truck and the manufactured truck. It has always been a problem in the motor truck industry: One man is interested in buying a so-called manufactured truck, and the salesman comes in and he says, 'Well, you ought to buy an assembled truck for such and such reason.' So in this little interesting book the envelope of which is entitled 'In Tune With Transportation,' and the booklet itself, 'Notes From an Engineer's Diary,' are set out arguments concerning the manufactured and the assembled trucks.

"These are supposed to be notes taken directly from the diary of the chief engineer of our factory, and the book gives arguments pro and con on the assembled truck versus the manufactured truck. The center spread is the plan of the truck, with brief descriptive data around it, and then comes a page just after the center spread which is upside down. Well, he cannot read it without turning the book around, and then he has to start all over from the back, and this is a little bit of comedy, but it puts across a good story for us.

Tells of Some Booklets

"This booklet has on the outside the title in embossed lettering: 'An Ocean of Proof, Not a Desert of Promises,' and inside of it is a little four-page folder entitled, 'Honor in Your Own Home Town Has to be Earned.' And we suggest to the consumer prospect that he get in touch with the owners of Diamond T trucks right here in Chicago. We believe that if we have won a good reputation for ourselves in our own home town we must have a pretty good reputation. And enclosed in the folder in a loose-leaf form are facsimile testimonial letters received from owners throughout the country. We take concerns that would be well known, like Montgomery Ward and the United States Tire Company, and so on."

Front Cover Pages of Some of the Literature Used in Diamond T Mail Compaign

Truck Weight Limit Ten Tons in Connecticut

Strict watch is being maintained on all trucks passing through Connecticut and arrangements have been made at the state line for weighing cars. When the cars are weighed they are sealed and passed. The last legislature set a limit of 25,000 pounds entire load but the same body also gave the highway commissioner the power to reduce this figure, and that official set the limit at 20,000 pounds this spring because of the damage being done to roads. Many cars were held up and some were ordered off the roads. It will take until summer if not later to repair the damage done to the roads this spring by heavy vehicles.

When a Bus Line Becomes Unprofitable

A FEW miles southeast of Pittsburgh is the city of McKeesport, one of the lesser steel-producing cities of the Keystone state, and a thriving, hustling city with all. Seven and eight-tenths miles away lies the town of Elizabeth, whose citizens have much business in McKeesport, and not a little pleasure, and between the two lie a chain of smaller towns all looking to one or the other of the larger places for much of their daily life. And between McKeesport and Elizabeth there is no street-car connection.

For several years this transportation lack was met in a spasmodic, uncertain way by "wild cat" touring car service, without regulation and with little satisfaction to the residents of the various towns.

About a year ago, however, motor truck buses began to make their appearance, running under charter of the state public service commission, and with the increase in this more modern method of passenger transportation the touring cars disappeared, and today Elizabeth and the towns along the way have a regular fifteen-minute service each way by motor bus, and twenty-four buses are engaged in handling the traffic. Unfortunately, the traffic is not at present sufficient to justify the use of twenty-four individually owned buses, with the result that the bus owners are not making the money they could if the route was properly regulated by the public service commission, as to numbers of buses licensed.

Service stars at 6.30 a. m., with a half-hour schedule till 8 a. m., when the fifteen-minute intervals begin and last till 7 p. m. Then until midnight the half-hour schedule is resumed. Usually several of the bus owners make a later than midnight trip, as there are always stragglers who stay over till the last regular trip has been made. And the late passengers have to pay double fare, under the provisions allowed by the state public service commission.

The fares charged during the regular running hours of the buses are as follows, each being figured from McKeesport:

Bravosburg, ten cents; Allequippa Crossing, fifteen cents; Coal Valley Bridge, twenty cents; Wilson, twenty-five cents; Clariton, thirty cents; West Elizabeth, thirty-five cents.

These rates are on file with the public service commission, and may not be deviated from in any particular. In the In the event that a bus owner overcharges, or in any way runs his bus contrary to good public policy, his license is revoked, and he can not again run on the route.

The road from McKeesport to Elizabeth is of macadam, very badly in need of repair at present, and the buses make the trip one way in upwards of a half hour, depending on the load, number of stops, etc.

Should Not Place Too Many Trucks on One Route

Because of the excessive number of buses on the route, there are always a half dozen or more idle at the terminals, a condition the state board should not make possible by licensing too many buses for the route. Each bus as it comes in takes it place at the foot of the line, and moves up one every fifteen minutes as the bus at the head starts out for Elizabeth.

Most of the buses on this route are Reo "Speed Wagons," fitted with a light, inexpensive body, the truck and body weighing approximately forty-three hundred pounds. Seats are lengthwise of the body, and fourteen to sixteen passengers may be seated. One three-quarter-ton White truck, another two and a half-ton truck of the same make and an Acme truck are also among the types used on this route and with the exception of the White trucks all are pneumatic equipped as to tires.

The McKeesport-Elizabeth route shows very conclusively that motor bus lines properly run are a very good investment for the man who goes into it in a business like way, and it also shows that those state commissions who have to do with the licensing of motor bus lines should not license more buses than the traffic will warrant, as it is to the benefit of the public that few enough buses are running so that all may make money, otherwise proper service can not be maintained, as bus owners will gradually give up the business and the public will therefore be without any transportation.

As in the past, with street car franchises, so in the future with motor bus franchses, there will have to be a fair limitation placed on the number of companies allowed to do business over specified routes, that the public and those furnishing the transportation may both be benefited.

Line Up of Motorbuses at "Diamond Point," McKeesport, Pa.

Commercial Hauling Interests Propose National Organization

A conference of the commercial hauling interests of the United States will be held in Chicago June 26 and 27, at which will be discussed the forming of a National Association of Commercial Haulers. Approximately thirty state and local cartage associations will be represented at the meeting, among them being representatives from Michigan, Ohio, Indiana, Illinois, New York, Pennsylvania, Massachusetts, Louisiana, Iowa, Nevada, California, Colorado, Washington, Texas, Missouri, Nebraska and Wisconsin. Delegates to this convention will also attend the meeting, June 28, 29 and 30, of the National Team and Motor Truck Owners' Asso., in Chicago, and a plan is on foot to merge the older and newer organizations in an association composed of commercial haulage concerns only.

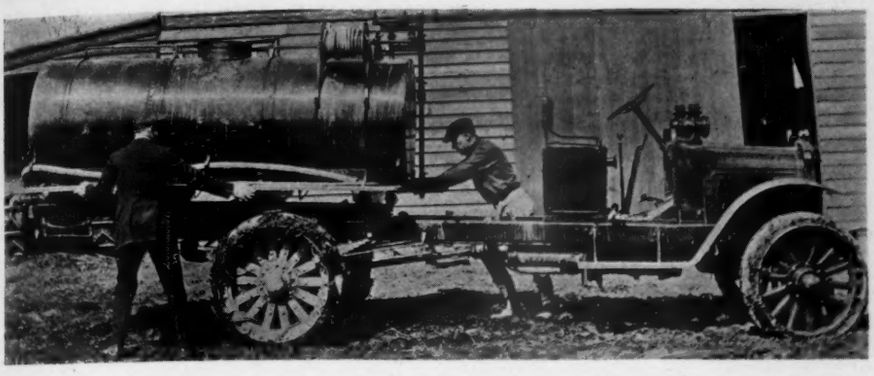
F. L. Henk, managing secretary of the Detroit Transportation Association, an organization of motor truck and haulage men in Detroit, is making preliminary arrangements for the Chicago conference at the request of the newer organizations. In a letter sent out to the various associations a definite national policy has been outlined as follows:

1. Establishment of a permanent national clearing house for information and ideas of benefit to all. 2. Education among members on trucking costs. 3. Creation of a scientific section for the study of problems confronting the commercial hauling industry, and to increase efficiency. 4. Protection against inimical legislation, national and state, and support of constructive legislation. 5. Placing inter-city motor transport on a sound business basis. Solution of the "Return Haul" problem. 6. Furthering road building that will withstand heavy trucking. 7. Assistance in the organization of state and local associations, thereby aiding in stabilizing the cartage industry. 8. Creating closer acquaintances, encouraging and promoting confidence and eliminating unfair business methods in the hauling industry. 9. Promotion of a systematic understanding between truck manufacturers and dealers, and commercial haulers. 10. Striving for sympathetic public understanding in the unlimited possibilities of motor truck hauling and the problems that confront the operator.

From replies received by The Detroit Transportation Association, the national organization promises to be a success. Inquiries are solicited from commercial haulers' associations that may have been overlooked in the first call for the Chicago conference.

New Republic Orchard Sprayer Performed Successfully at Recent Test

The Republic Orchard Sprayer, designed and built by the Republic Motor Truck Company, Inc., Alma, Mich., recently conducted a test of its new Republic Orchard Sprayer, mounted on a 2½-ton chassis in a 1200-tree apple orchard, in Staunton, Va. In this test the lime and sulphur solution was sprayed by two men, while the third drove the truck. The trees in this orchard were sprayed at the rate of about 150 per hour.



The Entire Tank and All of Its Equipment Being Removed

The Republic tank has a capacity of 6000 gal., and the pump, which has a capacity of 30 gal. per min. against 300 lb. pressure, is of the Northern Rotary type and is driven from the power take-off taken from the transmission. The excess capacity of the pump not used by the nozzle is pumped back into the tank through jets located along its bottom, thereby providing perfect agitation of the spraying liquid. The pump operates either while the truck is in motion or while standing still and the spray thrown by the guns is very fine.

The most prominent features of this sprayer is that the tank is self-filling, self-agitating and self-cleaning. The entire tank and all of its equipment are easily removable. This enables the owner to use the chassis for general hauling when the sprayer is not in use.

"Carrying on" Through Winter Blizzards

IN a recent issue of the "Floating Power Plant News" published by the U. S. Motor Truck Co., of Cincinnati, Ohio, an interesting story is printed on the performance of a fleet of U. S. Trucks in the service of Geo. B. Newton Co., Philadelphia. The interesting fact brought out in this account of how this fleet of trucks kept going continuously during the past winter, is that the old prejudice, that trucks would not perform in snowstorms and severe weather, has been entirely overcome.

It was only a few months ago that the eastern section of the United States was swept by a series of blizzards that worked havoc with train and street car service. Hardly had the roads been cleared of the remains of one storm when another came along to mess up things generally. Through all this the Newton fleet operated continuously.

Daily reports taken at random from the Newton operating cost sheets show what the average performance was of these trucks. The records show the performance of six of these trucks on February 5th, the day after the big snow. On this day traffic was practically paralyzed. Under these conditions, the work these trucks did was remarkable.

The following table shows the number of hours each truck was in service per day, distance traveled, and amount of coal delivered.

No. 6	No. 26	No. 25
10½ hours	10 hours	11½ hours
32 miles	25 miles	37 miles
22 tons coal	25 tons coal	18 tons coal
No. 12	**No. 5**	**No. 2**
10 hours	10 hours	11½ hours
19 miles	29 miles	32 miles
24 tons coal	18 tons coal	22 tons coal

Incidentally it might be stated that there is no other coal company in the United States with more accurate or more complete truck operating cost records than Newton — they have their own garage, service station, machine shops and body building plant. They build all their own bodies and hoists, and do their own repair work. Consequently, they know exactly what they get in the way of service from every truck they own, what each costs to operate, how long each one is laid up for repairs.

The only additional expense which the owners had was that of chains—during the February storm they used over $1,500 worth to get traction, and each truck wore out a set a day.

Washington Highways Improved

The comprehensive state highway system which links Seattle, the western terminal of transcontinental trails, with Spokane and the South, is to be improved materially as a result of the work of the state highway commission and the nation's summer playground will add to its charms with improved highways.

According to official figures issued by James Allen, Washington state highway commissioner, since the legislature adjourned March 13, 1919, the highway department has located, prepared plans and estimates, secured right of way and let 113 contracts for the construction and improvement of 525 miles of new road at a total cost, not including engineering, of $10,378,000, and for the construction of 25 concrete and steel bridges at a total cost, exclusive of engineering, of $1,701,000.

Line of Thirty U. S. Trucks in the Service of the Geo. B. Newton Co., Phila., Pa.

Protecting the Truck Tradesman's Printed Matter

(*Continued from page 37*)

conversant with trade conditions and competition, and thus to be able to distinguish readily between, say, the catalogues of several different firms, even though all the catalogues be gotten up on the same general plan. With the heedless, superficial, ultimate consuming public, however, the circumstances are different. Here there must be considered the danger that a casual reader will mistake one piece of trade literature for another if the two be similar in "dress" and consequently we find the courts taking into careful account the destination of printed matter that is alleged to overlap.

When it came out, a few years since, in a controversy between the Edward Hilker Mop Company and the United States Mop Company that the printed matter in dispute was to be sent only to agents and prospective agents and was not likely to be shown to ultimate purchasers a Federal court held that a degree of similarity was less serious than it would otherwise have been. To the same end, another Federal court decided in the case of G. W. Cole Company vs. American Cement & Oil Company that an element of similarity in the circulars put out by rival concerns was not to be taken too seriously. It was established that the twin pieces of printed matter went only to jobbers and were rarely if ever seen by retail purchasers.

Defining the Term "Used"

Of deep significance to the commercial car industry are the ethics which have, by compulsion, lately been established with reference to the advertising of "used," second-hand, or "rebuilt" machines. The mandate has been given in unmistakable terms that prospects for "used" wares must not be left with the impression that the offerings are new products of the factory. Though negative, in a sense, in its action this move is one of the most important made in many a year for the protection of the printed matter of business houses that desire that the purchasing public shall take their printed statements at face value. The Federal courts have, in decisions such as that in the case of Todd Protectograph Company vs. Hedman Manufacturing Company, specified that advertisements of used or rebuilt machines must reveal the goods are rejuvenated rather than brand-new products and this same doctrine has lately been followed by the Federal Trade Commission in a number of instances where the printed matter of "typewriter exchanges," etc., told the truth, perhaps, but not the whole truth.

Protecting House-Organ Literature

In the commercial car, accessory and supply field new incentive for the protection of printed matter has been supplied by the circumstance that many firms now issue periodically or at irregular intervals "house organs" or private magazines. Usually these single purpose journals are sent regularly to all the names on a firm's list of customers and prospective customers, and just in proportion as the business house expends money upon its "house organ" is it likely to be keen to keep the contents for its very own. Broadly speaking, the best safeguards for house organs are precisely the same as are employed by the publishers of leading trade journals and literary magazines of general circulation. Each issue of a house organ may be copyrighted if desired, but even more important is the establishment of a monopoly in the name of the house organ by registering it as a trade-mark.

For a time, in years gone by, the United States Patent Office declined to admit the titles of house organs to trademark enrollment on the theory that such publications, not being sold to readers, could not be accounted "articles of commerce," and consequently eligible to trademark shelter. In a memorable test case, however, the Curtis Publishing Company won recognition of the fact that even though a house organ had no paid subscribers the publisher must, perforce, expect to receive some return for his publishing expense and that accordingly house organs, whether carrying advertisements or not, were articles of commerce within the meaning of the law. Since that time house-organ titles have been enrolled without question, and in a few instances certificates have been obtained covering the names of "departments" or cartoons or pictorial features in house organs.

Speaking of the concession made in opening the avenue of protection at the patent office to house organs brings to mind the fact that new latitude has lately been allowed in the authentication of advertising pictures. It has all along been practicable for the motor truck man to secure a certain amount of protection for a poster, street-car card, hanger or other illustration by copyrighting such subject as an "advertising print" just as he might copyright a label. However, some tradesmen who have used given pictorial compositions over and over again until the representations came to have, in the public mind, a definite association with the product, desired something a little better. To be exact, they aspired to trade-mark recognition for such pictures, but the way seemed to be barred in that the law requires that a trade-mark shall be something more than an advertisement. On the other hand, it has been decreed that a mere representation of the goods which a trade-mark is to identify cannot serve as a trade-mark, because such a picture is just as "descriptive" of such goods as any words could be and the descriptive element is specifically prohibited in trademarks.

Within the past few months, though, a broad-minded Commissioner of Patents has been induced to give leeway for this better protection—and in some instances it will amount to double protection—for pictorial printed matter. The arbiter of the patent office has not receded from the traditional position that a mere representation of the goods cannot pass muster as a trade-mark. What he has conceded, however, is that a picture which presents, in addition to the portrayal of the goods, other features and embellishment must not be too harshly denounced as a mere representation of the goods and nothing more but is eligible to recognition as a trade-mark, provided it is regularly given a bona-fide trade-mark use by attachment to the goods. This more liberal attitude on the part of the Patent Commissioner means that in the case, say, of paint for motor truck bodies, a picture of a can of the paint would not be allowed status as a trade-mark, but a picture showing a man painting a truck body probably would be accepted without question.

For lithographs and other similarly pretentious printed forms, entry as an "advertising print" is well worth while if for no other consideration than the privilege to post that most effective warning to trespassers "Reg. U. S. Patent Office." It is worth while to relate, however, that several well-known firms have suffered keen disappointment when they essayed to protect by single registration as "prints" sets of pictures bound together to form booklets. One series of advertising designs recently submitted at Washington comprised the respective letters of the alphabet, each appropriately embellished. In this and similar cases, however, the ruling has been that the collection of pictures cannot be accepted as an entity, but that each subject in the series must be separately entered as an individual advertising print.

Protecting the Sales Slogan

With a fad for sales slogans sweeping the commercial world many inquiries have been received at Washington as to what protection is available for slogans. The answer is that two kinds of testimonial to ownership may be requisitioned. If the slogan be embodied in an emblematic or other design, a copyright may be produced. This has been done in the case of such slogans as "We Ship Everywhere." On the other hand, if a slogan is regularly affixed to goods as a mark of origin, it may be registered as a trademark, provided, of course, it is not descriptive in character. Among the familiar slogans that have been thus credentialed as trade-marks is the admonition of a well-known hardware house to the effect that quality will be remembered long after price has been forgotten.

Obtaining Title to a Trade-Mark

Every now and then an agent or retail merchant in the truck or accessory field revives a rude jolt when, as a means of giving individuality, he adopts a trademark, emblazons it on his stationery, and sends it in for enrollment as a means of "sewing up" the privilege of its use. Naturally, the tradesman is unpleasantly surprised when the patent office informs him that his trade-mark, for all its brave use on letter heads and envelopes, etc., can have no title insurance policy from Uncle Sam's bureau, and that he must look to the common law for protection for his printed matter. The rub here is not, as some suppose, that the applicant is a retailer, not a manufacturer. Any "trader" can claim title to a trademark no matter whether he makes the goods or only selects and sells them.

YOU CAN SELL your customers Firestone Holdfast Patch Stock and know they will get full satisfaction and most miles per dollar service. Comes in a strip and cuts to fit any size rip or hole.

Firestone Accessories are designed to be most profitable to the dealer by being most useful to car owners. Of seeming unimportance in themselves their dependability adds much to motoring pleasures.

Also they build business for dealers greatly beyond their relative value to other stock carried. Order direct or through your jobber today.

FIRESTONE TIRE & RUBBER CO.
Firestone Park **Akron, Ohio**
Branches and Dealers Everywhere

Holdfast Patch Stock repairs all injuries to inner tubes. Complete with tube of cement and metal buffer.

Firestone

HOLDFAST PATCH STOCK

The fly in the ointment is that the courts and the patent office tribunals will not recognize impressions of a name or design on stationery or in advertisements as a trade-mark use. Once a trader has obtained title to a trade-mark by the requisite process he is free to flaunt that mark as much as he pleases on his letter heads, business cards, show windows, delivery cars or any other medium. But to begin with, and to qualify as a trade-mark owner, there must be bona-fide use of the mark on the merchandise and that identified merchandise must pass in interstate commerce, not be offered solely in local territory.

Overloading Dump Bodies is a Poor and Expensive Policy

THIS article by F. L. Henk, managing secretary of the Detroit Transportation Association, deals principally with dump trucks with which the overloading evil has been the most prominent, the results of overloading, however, are the same regardless of type body.

The purchase of a truck whether by Corporation or individual represents an investment intended to be a profitable investment and give long, continuous service to its owner.

To satisfactorily perform the service for which a truck is intended, its owner must recognize that the responsibility for such satisfactory service rests almost wholly with him.

The use of the dump motor truck has effected much economy in excavating work, but there is one condition which has developed in the use of these trucks which threatens to do a lasting harm to the industry of dump truck hauling and inflict a severe wound on the motor truck industry in general, and that evil is the evil of overloading.

There is not much danger of this evil during the summer months, as there is usually plenty of work for the dump truck, but during the winter months, taking advantage of the slack conditions, some so-called "excavating contractors" have seized the opportunity of placing immense overloads on dump trucks in their employ. The dump trucks which the excavating contractor claims he is operating are usually trucks which belong to individual owners, who are purchasing them on a time basis, the trucks being bought on a down-payment of 25 per cent, with the balance payable in twelve months. With the present high cost of motor trucks, the monthly payments are, of course, high. It is at this point that the individual operator is coerced into working his truck overloaded. He sees the business of excavating dropping off, and fearful of his obligations to the truck dealers, he sells his services to the excavating contractor at a rate which is below the actual operating costs of his truck, and permits the truck to be overloaded, little dreaming of the disaster which awaits him.

"Overloading," to quote from a leaflet addressed to motor truck operators by the Pierce-Arrow Motor Car Company, "increases the stresses in the weight-carrying members and may cause excessive breakage of these parts. In any good truck, normal weight, hence normal stress, produces normal wear of moving parts. An excess will necessarily result in abnormal or excessive wear. A truck frame and other parts may be compared to a bridge. When a bridge is rated at so many tons, it means that it can carry that load with a certain margin of safety. It will carry more, but the margin of safety which was provided to take care of its depreciation in normal service will not be as large. The same is true of a truck."

"Overloading decreases the ability of the truck to negotiate road conditions, since there is a greater weight to be moved per unit of engine power. A result is excessive gasoline consumption and slower operating speed; therefore, greatly reduced efficiency."

If the building contractor insists on overloading the trucks on his job, the axles, tires, wheels, springs, frames, brakes, transmission and engines of those trucks are going to be prematurely worn out and extremely expensive to maintain before they finally do come to an untimely end.

In order to make a success of the system of motor truck transportation it is necessary for the trucks to be making a profit for their owners. The owners must be in a position from the start to know whether their trucks are making or losing money. An overloaded truck is never making a true profit. What it earns temporarily by hauling overloads, it will lose in repairing and replacing the parts worn out by the strain. It will have to be relegated to the scrap heap before its time, leaving nothing but a trail of waste in its wake."

The Detroit Transportation Association, as representing 260 commercial hauling concerns in Detroit, wishes to place itself on record as unalterably opposed to the overloading of dump motor trucks. We believe that with the present state of curtailed production in all lines of work, the conservation policy in effect during the war should be continued until such time as conditions are again normal. At present, motor truck production is not up to the demand, and the premature wearing-out of dump motor trucks, with the attendant slowing-up of excavation work brought about through break-downs, etc., is a serious question which we believe is blocking the proper development of the motor truck in one of its most important spheres—excavating.

Not only does overloading ruin the individual operator of the truck who persists in it, but it also hurts the motor truck industry at large by engendering a feeling of distrust in the mind of the truck operator as to the real merits of the motor truck he owns—and overloads. Premature wearing-out of parts leads him to believe that the truck is of faulty construction and he does not think to blame, not the truck but the overloading.

Brakes on an over-loaded vehicles do not work properly. On over-loaded dump truck running through city streets is a menace to the public. A truck of large capacity, fully loaded, requires a maximum of skill and power to bring it to a quick stop, as is often necessary in our ever-increasing congestion of traffic. If a truck is overloaded, the operation is made doubly hard and the brake mechanism is called on to perform a task for which it is not built.

Summing up all of these points, it is easily seen that overloading dump trucks is mighty poor business, and the excavating contractor who persists in overloading is traveling on very unfirm ground.

Don't overload, don't overspeed, drive carefully over rough roads, see that your truck is well lubricated and adjustments made when necessary and your truck purchase will prove to be a most profitable investment.

Trucks in Logging Operations

Few people not actually engaged in lumbering and logging operations realize what the motor truck is doing in connection with that business.

At present one finds comparatively few mills on the railroads; most of them being located five to fifteen miles distant. The average cut of the sawmills in the Northwest is about 30,000 feet per day. Every log must be hauled seven miles to the railroad. The estimated cost of transporting logs by truck is $2 per thousand feet, as against $7 when horses are employed.

Most of the mill men throughout the Spokane country realize that they must look to the motor truck for a future means of marketing their product. When a new mill site is selected, careful consideration is given to road possibilities, not only from the mill to the railroad, but from the standing timber to the mill as well. Steep grades are being eliminated, and roads are being constructed for successful motor truck transportation.

It is conceded among far-sighted lumber men that the use of motor trucks is just fairly started, for as distance increases the number of trucks used increases, and it is believed the number of trucks used for lumbering and logging in the Northwest will more than double each year for the next ten years.

To measurably relieve freight congestion, assisting shipper and consumer, has been suggested by J. T. Ross, traffic commissioner of the Detroit Chamber of Commerce. It is his contention that a large amount of goods could be moved from Detroit to driveaway destinations, loading the automobiles lightly enough to avoid strain. Several hundred cars leave Detroit daily, and hundreds of cars and trucks pass through Detroit daily from other production points.

Ross Gears

A ROSS-STEERED truck is certain to be the choice of the buyer who knows and appreciates the superior quality of ROSS STEERING GEARS in design, materials and workmanship.

He realizes that the motor truck manufacturer who has been willing to pay a little more to build into his truck the safety, reliability and easy steering that ROSS STEERING GEARS guarantee, has doubtless been just as particular about every other part of the equipment and construction of his truck.

One hundred and seventy-one different makes of motor trucks—representing nearly two-thirds of the entire industry—carrry ROSS STEERING GEARS as standard equipment.

Write for catalog and other information desired

ROSS GEAR & TOOL COMPANY
760 HEATH STREET - LAFAYETTE, INDIANA

Manufacturers of the Steering Gears that Predominate on Motor Trucks

ROSS GEARS

Motor Bus Line May be Operated at a Profit in Competition With Electric Street Railway

Careful Supervision and Intelligent Handling of Traffic Problem Brings Success to Fay Motor Bus Company. Only Rival is So-called "Safety-Car" of Electric Railways, and Motor Bus Can be Run Cheaper Than This Unit. Some Interesting Figures for Motor Truck Dealers to Study

By A. V. COMINGS

THE theory, accepted in some quarters, that a motor bus line can not successfully compete with electric street cars, even though the bus line charges a ten-cent fare, is being disproven daily by the Fay Motor Bus Co., at Rockford, Ill. This company, since last September, has operated in direct competition with the local street car system and while the cars of the latter are pounding along over rough rails with equipment sadly in need of repair, and charging a seven-cent fare, the Fay motor buses are skimming along the streets and adjacent country roads usually with capacity loads, at ten cents a head.

Ask any workman in Rockford's many humming factories whether he would rather have an extra hour at home in the morning and pay three cents more fare getting to work on a Fay bus, which lands him at his shop just about an hour quicker than the street car could, and the answer will be in the affirmative always. The street car he would have to take must follow its tracks through the business section, even though it has a full load of workmen headed for another part of the city, and anyone who has ridden a street car through business streets during the rush hours knows that its speed is the speed of the snail.

Not so the bus. The Fay company has intelligently figured out its routes, from workers' homes to their factory destinations, in the most direct way, and not through crowded business streets.

In the May issue was an article telling the methods used by the Fay company in operating its bus lines in Rockford. It is my intention in this article to show some of the cost figures deducted from actual operation of this company, which should prove enlightening to those who are interested in promoting motor bus companies elsewhere.

Improvements in mechanical design of trucks and in tires make it possible for buses, such as used by the Fay company, to run long distances without mechanical troubles of any kind.

Cost of Operating Bus 16 Cents per Mile

The only street car that could possibly compete with motor buses of this type under present conditions is the so-called "safety car," now being used in some cities. This car is operated by one man, who acts as motorman and conductor combined. A well-known street car authority places the minimum cost of operation of this type of car under present condition at .1938 cents per mile, and cost figures carefully kept by Mr. Fay show that he can operate one of his buses at a cost of approximately four cents less per mile. Mr. Fay further states he is certain that he could operate buses of the capacity of the safety car, if given a franchise for an entire city's transportation, at sixteen cents per mile.

And a factor that analysts must not overlook is that a motor bus often is able to cover its route with much less mileage than a street car, which brings its net earning proportionately higher. When extra street cars are put on during rush hours they must, of course, follow the rails over established routes, which is often through congested traffic districts. When extra buses are put on during rush hours they can take the quickest, shortest route between points where traffic originates and the ultimate destination of this traffic. Definite zones of traffic origin and destination during rush hours with the quickest through route between, can easily be worked out, as has already been done by the Fay company, with the result that fewer buses than street cars are needed to handle this traffic, because of the more frequent round trips possible with the speedier buses covering the shorter route.

The figures given in this article were compiled by the Fay company covering the operation of its buses during December, 1919, really one of the poorest months in the year for motor bus returns. Nevertheless they show a very healthy condition of the business, and are a fair guide to what may be expected in this type of venture. At that time the Fay company was operating 18 buses with an average capacity of 14 people, over routes averaging five miles. The fare was ten cents cash. The cars, mostly Reo "Speed Wagons," carried bodies 14 ft. long and 58 in. wide, with seats lengthwise, and weighed 4500 lb. The streets traversed were of asphalt, brick and macadam, and were in fair condition. The figures follow:

Revenue

Total revenue from transportation	$11,110.34
Average revenue per car	617.24

Maintenance

Total maintenance of equipment, including depreciation	$3,463.61
Average maintenance of equipment, including depreciation, per car	192.43
Conducting transportation for the month	3,472.51
Average per car, for the month	192.91
General and miscellaneous expense	1,530.85
Average per car	85.04

(This average is high, owing to the fact that the business had only recently been started. It has decreased with better organization of the business due to age.)

Recapitulation

Total revenue for the month	$11,110.34
Total operating expense, including maintenance, depreciation, conducting transportation, general and miscellaneous	8,466.97
Profit	$2,643.37

These figures are well worth studying. There is no question but that there are many cities in the United States where bus lines could profitably be started. Not irresponsible "jitney" lines but bus service run by a good business organization capable of handling the business in the proper manner.

Motor truck dealers should look into this subject in their own sales territory, as there are many places where transportation data may be compiled by the dealer leading to the establishment of bus lines, a very excellent outlet for his sales efforts.

No single subject in motor truck transportation is receiving more attention at the present time than this subject of handling passenger traffic by motor buses, and the live truck dealer is already looking about in his field with a view to getting his share of this business.

Trucks Save Levee

The value of a motor truck in an emergency was never better illustrated than when April floods threatened to destroy the levee protecting the Spring Lake farming district, Illinois. It was necessary to secure 25,000 empty sacks to be filled with sand and earth to prevent the embankment from crumbling. These sacks were located in various sections of central Illinois and a fleet of trucks was utilized for the purpose. One of these, an Oneida, owned by Murray & Medbery of Bloomington, made the run with 3,000 sacks, weighing two tons, from Bloomington to Manito, sixty miles, in three hours and ten minutes, moving over poor roads, rough in many places, and interspersed with mud holes. This performance demonstrates that good highways and truck equipment can be relied upon in emergencies.

The Genesee County Fair, Batavia, N. Y., believing in the importance of automobile exhibits at agricultural fairs, will erect a $30,000 building to be used exclusively for machine and tire displays.

SIVYER CASTINGS

The Sivyer Service of providing Electric Steel Castings has for its objects the decrease of machining costs and the increase of wearing-quality and life. Both are attained by methods which result from long experience and begin with the design of the casting itself. When we find that a casting we are asked to furnish is of a design not consistent with good foundry practice, we study its function in the completed unit and offer the necessary suggestions to make it a really practicable casting job without affecting in any way its function and efficiency.

Secondly: Sivyer Service analyzes the functions of the casting and specifies the proper composition steel for the job; long experience with carbon and alloy steels has enabled us to reduce costs and increase quality remarkably for many different industries.

Thirdly: Sivyer Service makes a careful study of the pattern and molding problems involved, for improper gating and insufficient risers are often the greatest wasters of machining labor and metal.

Fourthly: Sivyer Service analyzes carefully the proper annealing methods to be used and controls their proper application through unfailingly efficient equipment and men. In short, the Sivyer Service supervises every step necessary to secure unusually and unfailingly good castings of electric steel. It never relies on one factor alone, relies very little even on the natural freedom of electric steel from occluded gases and on its commonly recognized merit in resisting crystallization. It also depends but little on the inherent scientific accuracy of the electric furnace process. From casting-design to sand-blasting and tumbling, the fundamental superiority of Sivyer Steel is due to its men and metal. Their value is best proved by the fact that, although the production of steel castings is generally looked upon as a local one, the Sivyer market is national.

Specimens of two sets of twin castings used as rear spring seats and caps

THE Sivyer castings shown on this page replaced malleables because of the tendency of malleables to crystallize and break. The superior strength, toughness, and resistance to crystallization of Sivyer Electric Steel prevents such crystallization and breakage. In trucks, tractors, and automobiles, castings of Sivyer Electric Steel are being used by more and more manufacturers to a constantly increasing extent. They resist crystallization and wear amazingly; and they cut machining costs.

SIVYER STEEL

SIVYER STEEL CASTING COMPANY, MILWAUKEE

Transportation Prophecies

By GEORGE W. ALEXANDER, Manager Firestone Ship-by-Truck Bureau
Springfield, Mass.

PROPHECY NO. 1: Railroads will develop trunk lines that will enable them to handle efficiently the freight brought from all directions by motor trucks to the stations along their lines.

There will be uniform rates which will link up the railroad rates with truck lines operated by both the railroads and independent companies. There will also be uniform insurance.

Equipment will be standardized as to bodies for motor trucks and freight cars. There will be demountable bodies that will fit a motor truck chassis and platform freight car. These will be built in units such as one, two and four-ton capacities, so that any size load can be built up by combinations for motor truck or freight car. These bodies will be transferred from truck to freight car and vice versa at the stations. The units will be packed systematically for their destinations and rehandling of the freight will be reduced to a minimum.

Terminals for motor trucks will be located in outlying sections from which further distribution will be made under the same system.

The aim will be to make "Every Truck a Full Truck Every Mile."

PROPHECY NO. 2: Passenger traffic from new communities and sections having unprofitable railroad spurs will be handled by motor buses feeding trunk lines as in the case of freight. Larger bodies, on Giant Pneumatic tires will be used. Uniform rates will be established. Service will be the keynote in handling both passengers and freight.

PROPHECY NO. 3: Surface electric cars will be eliminated from the business center of the cities. They will stop at terminals at the circumference of a zone, the center of which will be the business center of the city. Motor buses of the larger type as above will be operated by the street railway companies in all directions from circumference to circumference of the zone passing through or near the center. They will operate through the business sections on streets three or four blocks apart, from which during the rush hours all other traffic will be eliminated, and they will operate under a skipstop plan. Patrons will find it as advantageous to walk two or three blocks to such service as to walk that distance to a subway or elevated stations.

The terminals on the circumference of the zone will be arranged so that passengers can be transferred easily and comfortably. The size of the zone will depend on the distance from the center to the edge of the business section.

PROPHECY NO. 4: Roads will be built to accomodate the motor truck traffic, not motor trucks regulated to suit the roads. A good road will be recognized as a road that meets the transportation needs of that time. A good road now will not be a good road in the future, although of the same construction. It will not accommodate the increased demand, therefore, will be obsolete. Highway authorities and legislators unable to catch this vision will give place to those able to see that progress demands that roads meet the transportation needs of the time.

PROPHECY NO. 5: Snow will be kept from streets and highways by melting it as a melting machine passes along. Such equipment will be considered necessary property by municipalities and state highway authorities.

The Federal Rubber Co., Cudahy, Wis., operators of a fleet of trucks between Milwaukee and Chicago are obtaining first hand cost and other data. Figures on actual operating cost will be supplied upon request.

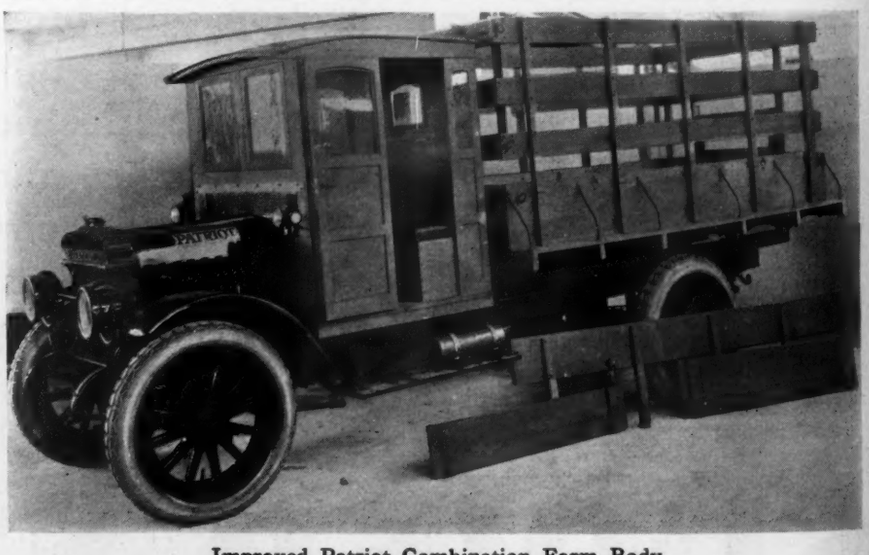
Buys Thirty-Seven Dump Trucks

Henry W. Horst, Rock Island, Ill., road building contractor, has decided in favor of light trucks for hauling sand, cement and other supplies. He has been using both types but has just reached the conclusion that in the long run, the lighter machines are the most satisfactory and most economical. The order he placed was for thirty-seven one-ton Fords with dump bodies. Although their capacity is small, Horst estimated that the upkeep, speed and economy of operation, more than offset the greater carrying capacity of the five- to seven-ton trucks commonly used for road buildng purposes. Horst secured the contract for constructing twenty miles of hard roads east of St. Louis along the Vandalia railroad, a part of the National Trail.

Gasoline is now $1.00 per gallon in South Africa.

Manufacturer Operates Trucks on Regular Schedule to Insure Delivery of Units

In view of the menace to production in delays incident to railroad strikes the Selden Truck Corporation, Rochester, N. Y., found that it would be necessary to take some steps if the factory wheels were to be kept turning. Quite a few units used by this company are manufactured in Cleveland, and it was possible to have a small supply of Detroit-made products sent over to Cleveland from that city. At the very beginning of the strike, two Selden trucks, a five- and 2½-ton model, were put on regular schedule between Cleveland and Rochester. For instance, on one trip the two trucks made the trip in less than 2½ days. The load carried consisted of 30 radiators, 12 steering columns, 70 springs, 136 transmission control rods, 2950 clevis pins, 400 fender iron brackets, 20 dashes and 165 drag links.



Improved Patriot Combination Farm Body

The Patriot Motors Company of Lincoln, Nebraska, have recently placed a new type body on the market to meet the special needs of the agricultural trade. This body is of the combination stock and grain type of especially heavy construction. The bottom panel is fourteen inches high, being built solid to the bed. As illustrated, the stock rack, which is fifty inches high, is constructed to be lifted off by one man, either in sections or as a unit, to be replaced by a 10-inch grain panel, thus forming a solid grain body. The stock rack is also equipped with hog gate in the rear, which can be entirely removed if desired. The sills and subsills of the combination body are constructed entirely of heavy kiln-dried oak, while the panels are built of genuine yellow poplar. This body is built in various lengths to fit trucks of all capacities, and is sixty inches in width.

Volunteer salesmen work for the Atterbury dealer

IN most cities buying an Atterbury is like joining a club.

The old "members" are the biggest boosters—and they work seven days a week.

This happy selling condition is simply the outcome of ten years of satisfactory service.

It is a condition which makes the Atterbury franchise more eagerly sought for each succeeding year.

Atterbury Motor Car Company

BUFFALO, N. Y.

ATTERBURY

MOTOR TRUCKS OF MAXIMUM SERVICE

Manufacturer Urges Truck Shipments

By A. V. COMINGS

IT has not been difficult in the past few years to secure the endorsement of short hauls by motor truck as an an economical measure, but most of these endorsements have come from those interested in some way with the motor truck interests, either as manufacturer, dealer or owner. At the annual session of the Chamber of Commerce of the United States at Atlantic City, April 28th, W. J. L. Banham, general traffic manager of the Otis Elevator Company, a man who looks at the matter entirely from the standpoint of what it will save the manufacturer, presented facts and figures which show beyond argument that the motor truck is the cheapest type of transportation thus far offered the manufacturer for hauling his product from ten to one hundred and twenty-five miles.

The Otis Elevator Company has branches all over the United States, and its annual shipments by rail mount into big figures. And when its general traffic manager, the man who has charge of all this shipping, says the motor truck is the proper medium of transportation for short hauls, the message carries the real weight of authority. In summing up his address, Mr. Banham said:

"In general, I am of the opinion that motor truck transportation can and should compete successfully with the carriers to short-haul points. The delivery time is all in favor of the motor truck and I am satisfied that if the manufacturers will take into account all the various costs and charges which are part of a true freight transportation cost, that motor trucks can be operated successfully in competition with the carriers for distances of between ten and one hundred and twenty-five miles."

No Need for Boxing Freight

One of the big reasons for the superiority of motor truck transportation over rail for short hauls, in Mr. Banham's estimation, lies in the fact that freight so hauled does not have to be boxed so heavily and carefully, thus doing away with many charges, each small in itself, but making an aggregate that must be reckoned with in true transportation costs. Says Mr. Banham:

."What I understand to be a true transportation cost is all expense involved in making a shipment, starting with the boxing or packing expense, together with handling expense in the shipping department, the loading of freight on teams for delivery to the freight house, teaming charges from the shipping department to the local freight house, and additional labor incidental thereto. To this must be added the less than carload freight rate and additional charge for cartage at the delivery point, with such other expenses that may be caused by requests for tracing, duplication of shipments lost or damaged in transit, entering of claims, checking of freight bills, delay in shipments in transit, and the expense of carrying additional stock to take care of freight in transit when moving via rail carriers.

"All of these costs are properly transportation costs, and are part of the shipping expenses which are paid either by the shipper or receiver.

"If you will make an analysis of the charges covering your shipments, it will be of interest to you to know the amount it costs to make less than carload shipments, and if you will compare these costs against the same shipments moving via motor truck, you should be in position to eliminate a number of the cost items, by reason of the fact that it is not necessary to go to the same expense for packing or boxing freight shipments when moving via motor truck, inasmuch as there is usually no transfer in transit.

"For the information of truck users I have compiled some figures showing the cost of freight movement compared with the same movement via motor truck. These figures are worked out on an average basis.

Changes Cost Figuring

"In practically every instance, it is necessary to prepare material for freight shipment in an entirely different way than if it moved via motor truck direct from the shipper to the receiver. It is necessary to go to considerable additional expense for boxing or crating, or to protect by other means, in order to prevent loss or damage in transit. This additional packing expense is necessary on account of the number of handlings the less than carload shipments receive at the hands of the teamsters and carriers after the material leaves the shipping department.

"We have included in the freight cost the first-class rate plus thirty cents per hundred pounds teaming charges at shipping and receiving point. To these costs must be added 17 per cent for the cost of carrying the increased weight caused by heavy boxing, and twenty-four cents per hundred pounds for the increased cost of boxing. The rate via motor truck covers delivery from the shipper's warehouse. I have averaged this rate, and believe it to be a fair one to use in comparison with the freight cost movement.

"The rates I have worked out are based on freight moving from New York to points specified, and in the freight cost item are included the various costs that I have referred to, such as increased boxing or crating, increased labor, and increased shipping weight. If we combine all of these costs, that is, additional costs, to make a less than carload shipment from New York to Newark the rate averages eighty-eight cents per hundred pounds. If you will take the same movement via motor truck with decreased boxing, decreased weight, and decreased labor, the rate averages fifteen cents per hundred pounds. Between the two points named there is a difference of seventy-three cents per hundred pounds in favor of the motor truck.

"The following table gives cost differences for varying distances:

	Freight cost per 100 lbs.	Motor truck cost per 100 lbs.
Newark, N. J....	.87	.15
Elizabeth	.87	.20
New Brunswick..	.87	.40
Chester, Pa.	1.01	1.00
Philadelphia	.98	.80
Trenton	.94	.60
Greenwich, Conn.	.98	.63
Stamford, Conn..	.99	.65
Norwalk, Conn...	1.02	.68
Bridgeport, Conn.	1.06	.70
New Haven, Conn.	1.09	.73
Waterbury, Conn.	1.12	.75
Hartford, Conn..	1.21	.90

"One of the greatest savings made possible by motor truck transportation is that of lumber and other material used for packing, together with additional labor and other charges incidental thereto. The amount of this saving, however, will be controlled largely by the material to be boxed or packed, and how much less protection can be used when moving via motor truck, as against a less than carload movement via freight.

"Have you considered the amount of lumber it is necessary for you to carry for boxing, the space necessary to store it, and the amount of freight charges you pay on wet lumber, if it is stocked in the open as is usually the case? Boxing lumber will frequently carry from 10 per cent to 25 per cent of its weight in moisture, unless it is passed through a dry kiln before being used for boxing purposes.

"Could you not use any space which can be saved by changing your shipping methods for manufacturing purposes?

Saves Valuable Time

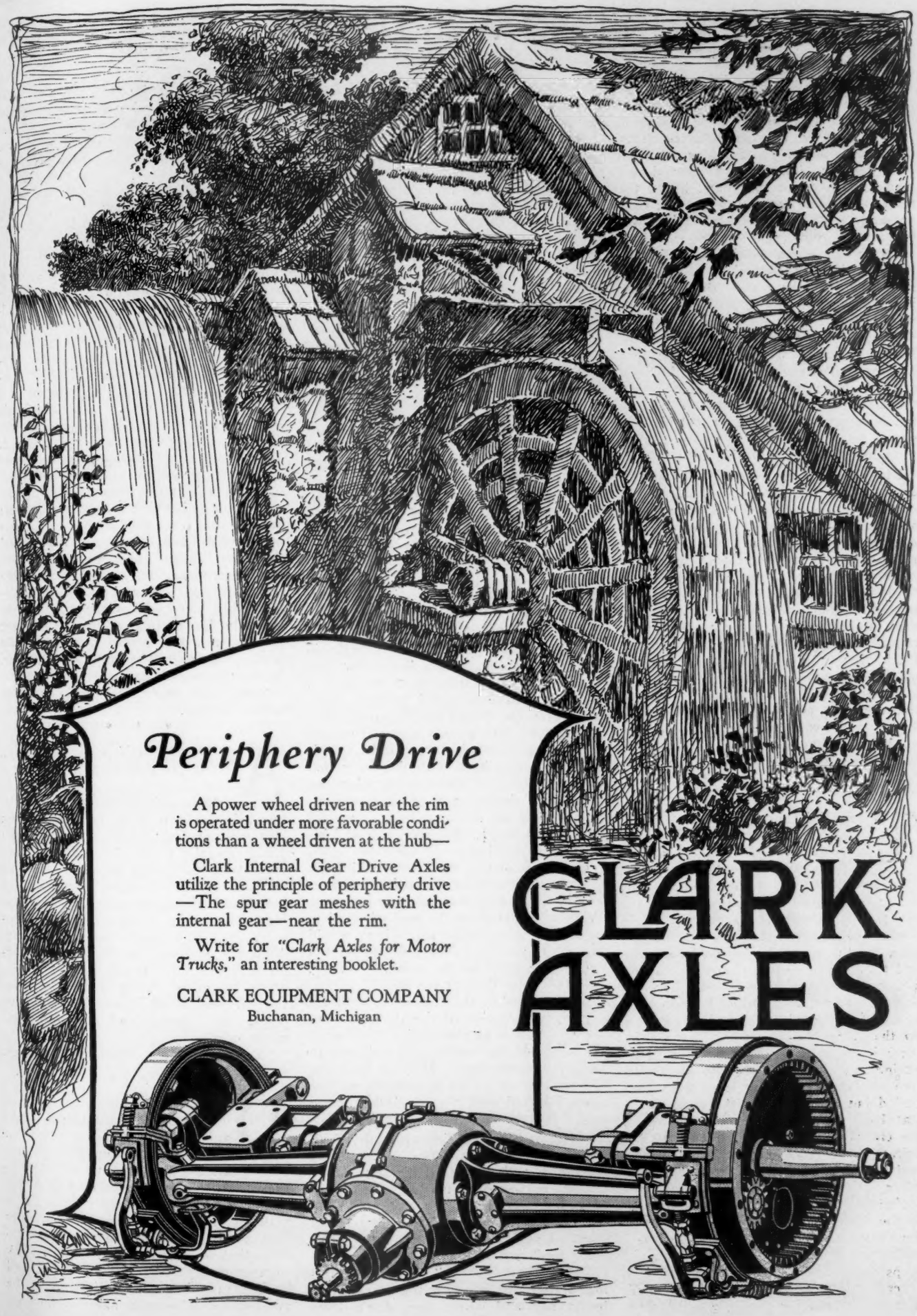
"If a freight movement takes thirty days as against one day via motor truck would it not be to the advantage of your company to use the difference in time, twenty-nine days, for manufacturing?

"Have you considered the amount of expense to manufacturers and others for storing and handling their products on account of uncertainty of freight delivery?

"Any comparison between rail carrier movement and motor truck movement is entirely in favor of the motor truck, as it is necessary for the motor truck operators to make delivery in the shortest possible time, in order to operate their equipment financially successfully."

Another Heavy Sentence for the Industry's Malefactor

ST. LOUIS, MO., May 17.—Twenty years in the penitentiary for the theft of a Ford car was put upon Martin Orman by a jury in the circuit court of the city of St. Louis last fall, and the Supreme Court of Missouri in an opinion recently published has decided that the sentence will stick. Orman is in Jefferson City doing time.



Periphery Drive

A power wheel driven near the rim is operated under more favorable conditions than a wheel driven at the hub—

Clark Internal Gear Drive Axles utilize the principle of periphery drive —The spur gear meshes with the internal gear—near the rim.

Write for *"Clark Axles for Motor Trucks,"* an interesting booklet.

CLARK EQUIPMENT COMPANY
Buchanan, Michigan

CLARK AXLES

Talks With Dealers

By C. S. PERRIE

A SALESMAN will rarely refuse an order for a new truck but the writer ran into a case in Boston recently when in the company of a salesman representing a well known make. The prospect owned two trucks of the same make and hailed the salesman on the street, opening the conversation with the question, "What will you allow me for my 2-ton truck?" When asked why he wanted to trade in the truck, which had seen about 14 months' service, the owner replied that it was a hoodoo car and that none of his drivers wanted to drive it. Further conversation developed that the engine bearings had burned out a short time ago and that minor troubles were reported by the drivers. The owner admitted that the bearing trouble might have been due to neglect but inasmuch as the drivers and his mechanic swore that the car was jinxed he thought it best to trade it in.

This the salesman refused to do and in a diplomatic manner tried to show the owner why he would lose by the transaction and pointed out that there was lots of service left in the car. The talk terminated with the owner remarking it was mighty funny the salesman did not want to do business, and the latter asking the owner to think the matter over. A few days later the writer met the owner who remarked that he had decided to keep the truck, that it was running like a sewing machine. At last accounts the truck was still on the job and the drivers believe that the jinx has departed. But the owner still fails to see why the salesman did not do business but does appreciate the refusal to trade. Did the salesman lose?

* * *

THERE is a dealer in New England who believes that lack of lubrication is one of the biggest factors in the service problem. "We have tried all methods to get the driver and owner to properly lubricate his truck without the success desired. Some will change the oil in the crankcase, fill the transmission and rear axle and turn down a grease cup or two but forget the universal joints and other important parts. So I decided some time ago that if these birds would not grease up that I would have to. Whenever a truck is sold the purchaser gets a letter stating that we will lubricate his truck free of charge during the guarantee period but he must send the truck in at stated intervals. We change the oil in the crankcase, gearset and rear axle, lubricate the universals, etc.; in fact, do a real job. Yes, it costs a little money for labor, grease and oils but what of it? I charge it up to each new chassis and to the sales account. It costs about $40 for a 5-ton truck but I consider it a small outlay and a mighty good investment. It keeps them out of the repair shop and is a service that satisfies. But better still it is educational for during the time the drivers come in they form the habit. Afterwards? Well, that's different, but I am working out a plan to oil and grease our different types for a fixed sum monthly after the guarantee expires. I believe I can do it on a cost basis and at a price that will appeal to the owner. And if I can get these birds to come in at regular intervals for this service it gives my men a chance to look over the truck. I figure it is a cheap investment and good advertising."

* * *

THAT'S the twentieth man to apply for a position as a mechanic and I had to turn him down," remarked the superintendent of a large service station in New York City. "And he's a good mechanic, thoroughly familiar with our car. He had months of factory experience and plenty of references but I cannot use him although I need men. Why? Because he's a floater. And there's barrels of them these days. That chap is clean cut and knows his business but he is a sample of the men these days. The majority are shopping for jobs. They will work in a shop a few weeks and in the meantime look around for another job where the money is better and the work easier or hours shorter. This is how they work. They hear of a place or go shopping. This bird is working over at ——— place and on the first call said that the foreman was a bad actor, etc. Wanted to come with us as we have a good organization, good workers were used right, etc. I told him that our policy was not to hire a man away from another shop. So this fellow jacks up his job and comes back with the story that he quit. Lots of them do it when we turn them down on their first application. How do I know he's a floater? Why that's easy. His references and his method of replying to my questions. Say, if I put that bird to work he would begin to spill stories about the different places he has worked in, the sights he has seen. Why he would plant the seed of wanderlust in my men and the single boys would itch to travel, for this fellow would tell them how to turn the trick. No, sir. None of these floaters for mine."

It developed in the conversation that a very small per cent of the applicants are engaged at this service station because of the policy of the company to endeavor to keep the same men. Married men are favored for they are less likely to become infected with the wanderlust germ which is very contagious these days.

When at a certain factory in the East, in the timekeeper's office, a workman walked in and demanded his time. The writer questioned the man as to his grievance and received the reply that he did not like the foreman, that the latter was always trying to speed him up. "He can't drive me," remarked the disgruntled mechanic. "To ——— with the job. I'm going across the street and get one with better pay and where they don't drive you." And he did. He remained there about a month and once more hit the trail. And this incident is typical among the service stations of the truck dealers.

The writer met an owner of a big service station who believes he has found a way of eliminating the floater to a great extent. His shop is run on a flat rate basis. The work is divided into a series of operations. To start with each man is taught but a single operation. He is not allowed to do any other work; in fact, he is broken in as a green man on repair work. In this way he becomes a specialist, a fast worker, and incidentally a cog in a big wheel. Special tools and equipment have been developed for each operation. With the development of labor trouble the company adopted the policy of a helper with each man. If the mechanic leaves the helper is ready to step in the position and another helper is put on. Knowing but one operation the mechanic is not able to go out and shop for a job other than in a shop operated along the same lines and at that the mechanic would have to find a position similar to the one he occupies, and this is not easy. And the men receive good wages but they have to produce. Possibly the knowledge that the helper can and desires the position is an incentive for the mechanic to maintain his batting average. At least the owner of this service station says he is experiencing little if any labor trouble. While the system has merit it is, unfortunately, not applicable to the average service station.

* * *

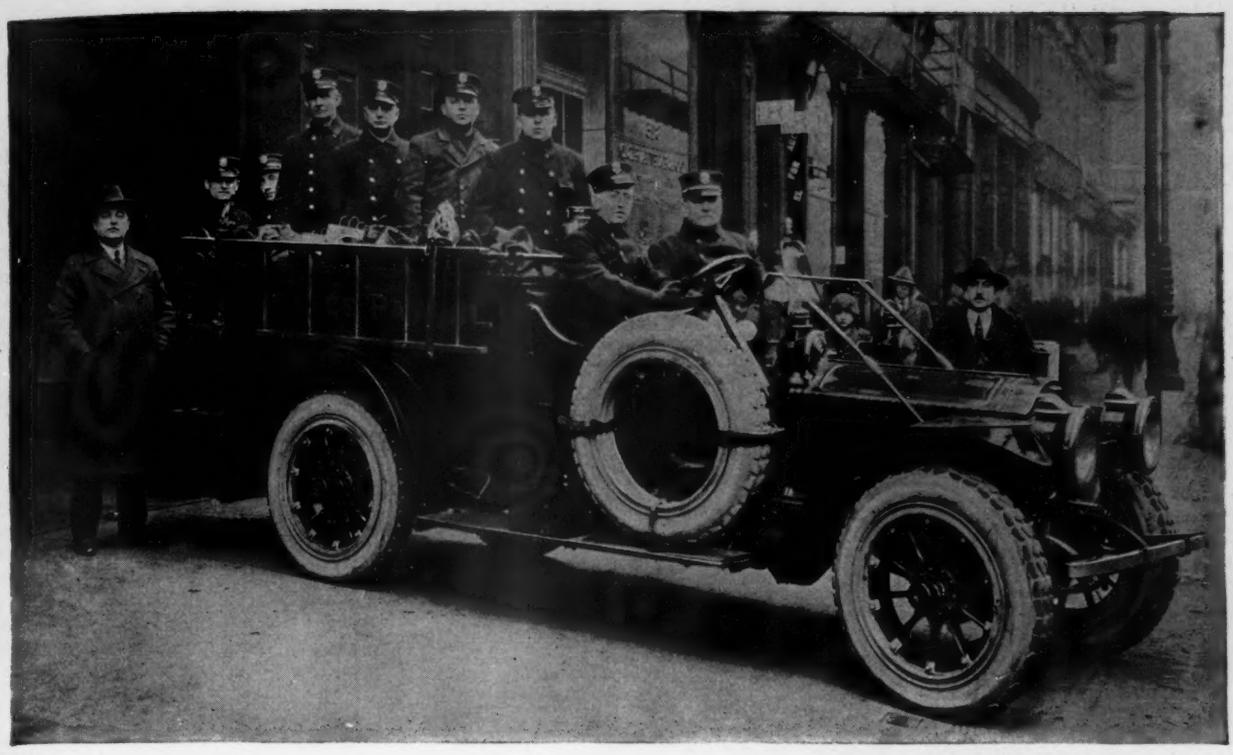
A DEALER in New Haven, Conn., sends the following letter after a sale.

"We find that much of the gasoline being sold is of an inferior quality. The continued use of poor gasoline will 'break up' the oil in the crankcase and destroy its lubricating qualities. In some crankcases we have drained, after a truck had been driven 500 miles, the oil was found to contain 12 to 14 per cent kerosene. For this reason we urge you to drain the oil from the crankcase and refill with new oil after the truck has been driven 500 miles. After the first 500 miles the oil should be changed every 1000 miles. We recommend only the best grade oils."

Yours for Good After Sales Service.

* * *

DURING a conversation with a dealer on merchandising trucks and salesmen this dealer said that one of his problems with his men was reconciling them to the so-called national business. It developed that the company this dealer represents has a national business policy which the dealer says antagonizes the salesmen. It provides that whenever a dealer sells a truck to a company that conducts a national business, has branches or interest in the prospect, it is termed national business



Underwriters' Insurance Patrol
Philadelphia Fire Departmen

Philadelphia–

Supreme in Fire Service

If there is one busy truck in all Philadelphia that cannot afford to experiment with poor equipment, it is the Underwriters' Insurance Patrol of the Quaker City's fire department.

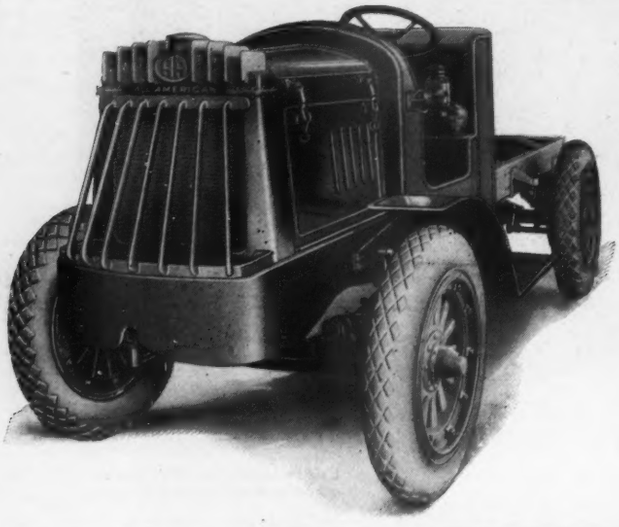
The necessity for speed in this hustling branch of service demands dependable trucks and the best tires possible—right here the well-known tractive properties of 'NOBBY CORDS' measure up to another big job—making good under most strenuous conditions.

Drivers have confidence on turns—when the big 'NOBS' grip the road with brute-like tenacity, affording the heavy, fast-moving apparatus a shorter turning radius—'NOBBY CORDS' have a reputation for holding immediately the emergency brake is applied.

Time savers—allowing speed with safety—plus greater traction.

United States Pneumatic Truck Tires Have More Traction

and, the dealer says, the salesmen get but 5 per cent commission. His salesmen work on commissions and they say it is not always possible to know if the prospect is a national account, at least in some instances not until the order has been filed or reported to the manufacturer. These conditions have a tendency, says the dealer, to discourage his men going after big business, fleet sales, and to try for repeats on national business for they say that 5 per cent is not sufficient. "And there is another angle," remarked the dealer. "The buyers coming under the head of national business get a 20 per cent discount. Now when they send to me for parts they insist on a 20 per cent discount which we cannot afford to give. If we refuse it creates ill feelings. What's the solution to the problem?"



Three-Quarter Front View of One of the New All-American Models.

The All-American Truck Co., Chicago, Ill., recently annnounced the addition of two new models increasing its line to three models. The two new models are of 1½- and 2½-ton capacity. Heavy grid radiator guards and bumper give an impression of massive strength, and are the distinctive features of these jobs. Six and eight-inch steel frames make up the foundational structure. They also include Hershell-Spillman engines and Cotta transmissions, Torbensen internal gear rear axles and Alemite grease-gun systems of lubrication.

Body Service Goes With the Oshkosh Four-Wheel Drive Truck

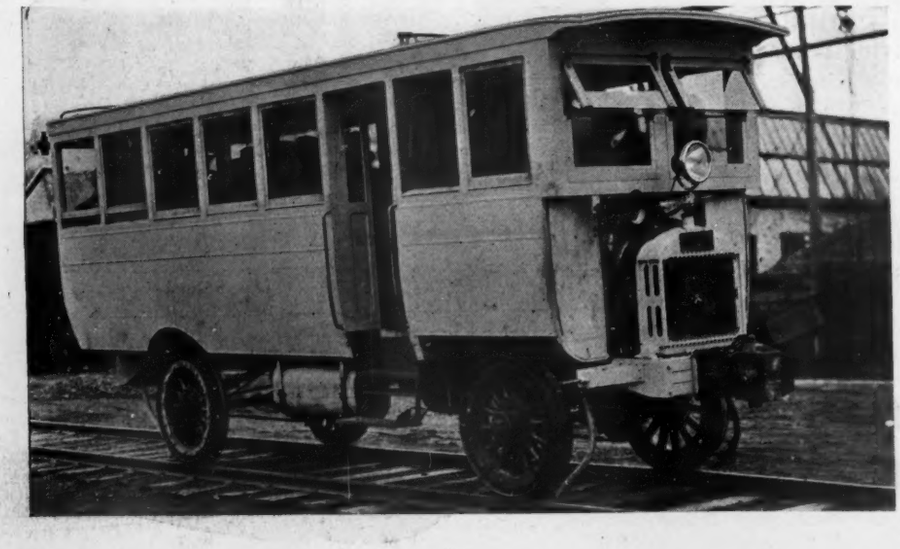
Not only are Oshkosh four-wheel drives, manufactured by the Oshkosh Motor Truck Manufacturing Company, delivered completely equipped ready for the addition of the body, but assistance is also rendered by securing the right body adapted for any particular service. This is due to a co-operative plan existing between the Oshkosh Motor Truck Manufacturing Company, and a body factory of national reputation located in the same city.

Standard or special bodies are built, under the personal supervision of the truck manufacturers, to correctly fit the various capacities of Oshkosh trucks. This close association with the body maker permits of prompt attention to this matter. The illustration herewith shows an Oshkosh four-wheel drive model AA2-ton truck with standard high-stake body and poles with top covering which is of heavy waterproof duck. This is one of the most serviceable of the many available types of bodies.

Edwin & Wasey Company, advertising agency, Chicago, have purchased a 100 x 100 site corner Huron and St. Clair Sts., and will erect a $450,000 office building.

First Magnet Crane Motor Truck

The Union Motor Truck Co., Bay City, Michigan, is the manufacturer of this Magnet Crane motor truck, which is claimed to be the first of its kind. This truck, as shown in the accompanying picture is a complete magnet crane, and was built on special order for H. Kramer and Co., scrap iron merchants of Detroit, Michigan. All operations are performed by power. It is equipped with quick-acting out-riggers in order to insure stability. The motor truck crane can be used for loading and unloading cars of iron, etc., for handling scrap iron in yards, for loading other motor trucks or drays, or for loading the motor truck itself, and can be used as a crane in handling any heavy object. It can also be equipped with a clam-shell bucket for handling gravel or other loose material. The crane has a lifting capacity of 3 tons at a 8-ft. radius, 2 tons at a 11-ft. radius, and 1½ tons at a 14-ft. radius. The magnet has a maximum capacity of fifteen hundred pounds, depending, of course, on the kind of material lifted.



Railroad Company Considers Trucks an Invaluable Unit for Short Haul Passenger Transportation

The Palatine, Lake Zurich and Wauconda Railroad appreciating the utilization of motor trucks to facilitate freight and passenger transportation on short hauls recently bought a 3-ton FWD truck equipped with flanged wheels, and passenger body for duty on its 16 mile track from Wauconda to Palatine, Illinois. The truck which has a capacity to care for 80 passengers also hauls a trailer loaded with freight and baggage weighing 5 tons. When not pulling a trailer the round trip of 32 miles is made on 6 gallons of gasoline.

Mobile 155 Millimeter Gun Mounted on Caterpillar Tank

By relieving the constant strains and cushioning the friction of shafts, gears and tracks, ball bearings have made possible smoother and more effective operation of man's mechanical developments.

Constant research to combat friction has produced Hoover Steel Balls of such perfect roundness and fineness of finish, that they make more efficient the operation of the huge tanks which play so large a part in modern warfare.

HOOVER STEEL BALL COMPANY
Ann Arbor **Michigan**

HOOVER
STEEL BALLS

Relation of Factory Sales Organization to Dealer

(*Continued from page 40*)

—all becaause they can't get the trucks for which they have already taken orders.

It is not the sales manager's fault that he can't make deliveries (though I do think that in these days a careful sales manager might help the truck business materially by having fewer dealers and these of a better quality), but there are times when dealers have a real kick coming on the kind of co-operation they get from their factory.

I recall an instance that happened in Iowa recently, that a truck dealer told me about. He had closed for a certain line of trucks a month previously, and had one two-tonner on his sales floor, on solid tires. And, by the way, when the district sales representative closed the contract with him he had assured the dealer that he would be down to see him often, and that his co-operation could be counted on. "He's never been near me since," said the dealer to me.

Well, this dealer had worked hard on his first prospect, and had finally signed him up for a two-ton job on pneumatics. He mailed the order in to the factory, and received word that he couldn't get delivery for two months. That wouldn't do, so he sent in the four wheels from his salesroom job, with the solids on, to be changed over, so that his customer could have the truck immediately.

Then came a series of exasperating delays on the part of the factory, wires from the dealer that lay for several days on someone's desk without even an acknowledgment, then answers that tires had to be sent for, then another delay and unanswered wires and letters, and finally a wire that the wheels would be shipped in a few days. It was all very unsatisfactory to the dealer, of course, not so much the delay, which he knew might be unavoidable, but the unanswered wires and the lack of attention paid to his needs by the factory sales force.

Of course, to the factory it was only one truck sale, only one out of the many they had to deal with daily. Nevertheless a dealer is entitled to prompt reply to every letter or wire he sends in, for he is on the firing line, and has to give some sort of reply to his customer.

And I sometimes wonder if the sales manager ever realizes, though it be but one truck, that the dealer may have worked hard against keen competition for a long time selling the prospect on that one truck, and that there is always the possibility that many other sales, a whole fleet, in fact, may hinge on this one sale on which the factory fails to co-operate. As a matter of fact, the incident related covered a truck on which the sale of five more depended, and the dealer naturally wanted to make delivery just as cleanly and as quickly as he could.

It is not just the sale of the one truck that the dealer wants to put across, it is the fact that every truck properly sold and delivered is another stone in the foundation on which he is building his business, and incidentally the business of the truck manufacturer he represents. I think if more sales managers would realize this fact these days and take the time to drill into their entire factory sales and service organization the necessity of closer and more hearty, friendly co-operation with the dealers, the future of the sales end of the motor truck business would be made much more satisfactory for all concerned.

What Happened When Tommy Studied Human Nature

(*Continued from page 59*)

"As to selling the farmer, J. G., I'll have to start at the beginning. While I was getting my place fixed up I read all I could get my hands on about farmers and farming and it was some, believe me. I got in touch with several live houses selling the farmer his implements, seeds and other supplies and through their sales manager learned that city ideas were not wholly applicable to the farmer. Then I checked up my data. In summing up I found that nothing cou'd be accomplished until I got the confidence of the farmer. Here I was a city chap coming into their midst with something to sell them that they knew nothing about.

"There's in this county a leader as in every community. He is president of the local bank, so I opened an account there and put myself out to cultivate his acquaintance. To make a long story short he was and still is very nice to me. From him I learned who was who and later on their financial status. Upon his advice I hired Billy Stebbins. Billy has always lived here and knows them all by their first name. He's really the whole works when it comes to selling. Of course I am educating him as to salesmanship, on cost figures, service and all that.

Getting Acquainted With Folks

"For days Bill and myself drove around the county breaking the ice, getting acquainted, but never talking trucks. At first it was rather frosty, but I guess in time folks got kinder used to seeing me around. Then I made it a point to put myself in a way of doing little favors for the folks. Always picked up anyone walking and gave them a lift. When any parties were held Billy would offer free use of a truck to carry the folks and I would tag on with my car, always taking the missus with me. Whenever there was anything to be hauled and there was a chance to show what a truck would do, Billy was on the job. All this time we made no effort to try and sell trucks. We were out to show what trucks could do.

"As time went on I joined the grange and all other farmer associations and I attended every meeting, with Billy driving the truck. If it was in some other town I advertised that a truck would leave here carrying any farmer who cared to go to the meeting. And I attended every meeting. Soon I was invited to the different social events and believe me these country times have it all over the city when it comes to being made welcome. Why I wouldn't swap places with Del here and he has some good job at that."

"The social stuff is all right, Tommy, if you like it, but what's it got to do with selling trucks? Farmers are like everybody else. They are out for value," said the sales manager of the Pawtucket line.

"You don't get the point, Del. To sell the farmer you must have his confidence. When you are able to visit him and talk farming you can interest him in a truck whereas your city man will fall down with his usual line of sales talk."

"Bunk," replied Del. "We've lots of dealers selling the farmer and they are city dealers at that."

Why City Salesman is Handicapped

"I'll grant you they do in some localities, but the percentage is small when you consider the potentiality of the market. And I don't care about his line either, even if it should be better than mine, which isn't possible. No, you're wrong, Del. You've got to get the 'atmosphere' as they say, before you can put them over big. And furthermore, I make every effort to bring the farmer and his folks into my place. That is why I have all this stuff," said Tommy, with a wave of his hand. "I tell all the folks to come in here and rest after shopping and bring their parcels. They have books to read, there's a mirror for the women and other conveniences. All this helps, as it establishes a direct contact with my prospects. And when 'pa' asks 'ma' about a truck, do you suppose she gets out her hammer? Not so you would notice it. Why I am Tommy to about all of them around here. And notice that bulletin board? Well on that I post all notices of grange and other meetings of interest. If a farmer wants to post a notice of something to sell he can do so. Make the farmers feel at home when he visits you and you will do much towards breaking down the barriers."

"May be a good system, but looks like wasting lots of time," said Del.

"Not so," flashed back Tommy. "To sell the farmer you must do as he does. First plow and fertilize the soil. Then you plant the seed and cultivate, and if your methods are right you will garner the harvest."

"Tommy's right, Del," broke in J. G., and ever practical he inquired about Billy Stebbins and the farmer the former sold that day.

The Resiliency is Built in the Wheel

One of 500 Truck Dealers Who Sell and Endorse Sewell Cushion Wheels

PHONE, GLENDALE 7081

RALPH J. HANDY
DISTRIBUTOR

GENERAL OFFICES AND SALESROOMS,
554-60 GRAND RIVER AVE

International MOTOR TRUCKS

SERVICE BRANCH,
1900 EAST GRAND BOULEVARD

DETROIT, MICH., April 12, 1920.

Sewell Cushion Wheel Co.,
Detroit, Mich.

Gentlemen:

We have your letter of the 9th inst., relative to a set of Sewell Wheels for the E. J. Dawson Pickle Company, order which was taken this week. We also wish to advise that we have sold a set of Sewell Cushion Wheels for a Model G 2-ton to the Liberty Bottling Works, Detroit, Mich. Also sold a set of Sewell Cushion Wheels for a Model G two-ton International to Mr. Ed. Leonard, 279 Auburn Ave., Pontiac, Mich.

We know that the talk which your Mr. Linsell gave our boys last Monday morning was interesting, instructing and beneficial, and three sets of Sewell Wheels for Model G two-ton Internationals this week shows the effect of co-operation with sales organizations.

We are planning to keep a Model G 2-ton International on our floor at all times with standard equipment Sewell Cushion Wheels in order that we may make prompt and effecient delivery, also that our salesmen may have a complete demonstrator to show prospective customers.

Without a question Sewell Cushion Wheels eliminates a lot of our service trouble and we are, therefore, only too glad to co-operate with you in every way possible for the furtherance of Sewell Wheels to our mutual benefit.

Very truly yours,

RJH*L

Sewell Cushion Wheels can be applied to any motor truck without changing the original design or construction of the truck.

Permanent Resiliency Means a Satisfied Customer and Dealer

SEWELL CUSHION WHEEL CO., Detroit

Branches and Distributors in 40 Principal Cities

"So Billy sold Zeke Thomas, did he? Well, I knew he would in time. A hard prospect—one who has given me uneasy moments. What did Thomas have to say?"

J. G. explained and Tommy nodded his head. "That's Billy's one best bet. He's put it over before. And furthermore, J. G., it may interest you to know that Billy does the demonstrating, selling and teaching and sees that his customer gets service. Follows them up in his flivver. It works out great. Now there is a case of a farmer about 10 miles from here which illustrates the point. He bought a—"

"Hey," cut in the Yearrich tire man." I struck Hawkins a dinner on Stebbins' sale and I'm hungry as a bear. This talk doesn't fill my stomach and why spill all this stuff for Hawkins unless you've got it copyrighted?"

At this point Jimmy stuck his head in the door and reminded Del that he would miss the 4.15 unless some one stepped on the accelerator, "but I guess the old boat can make it."

"Jimmy," remarked J. G., in dulcet tones, "did the thought ever penetrate your cranium that possibly Mr. Hawkins might miss a train?"

"No," replied the unabashed Jimmy. "Why should he miss her?"

"Aw," said J. G. "Grape nuts."

Motor Truck Shipments Save Chicago From a Building Tie-up

How a Fleet of Heavy-Duty Trucks Hauled Huge Quantities of Cement to Keep Building Operations Going. Trucks Are Kept in Good Condition by Careful Oiling and Daily Washing

By DAVID D. BUSH, Assistant to the Vice-President, Consumers Company

MOVING trainloads of cement without care—that was the problem we faced late last winter. As on one or two former occasions when rail shipments were completely tied up, we called upon our large fleet of heavy motor trucks, and they brought in the cement day after day on schedule. Operating over a nearly continuous ribbon of hard-surfaced highways connecting the cement plant at Buffington, Ind., with the paved streets of Chicago, these trucks carried direct to the job as much as 2500 barrels, or the equivalent of twelve good carloads, in a day. And the cement was badly needed, for otherwise much of Chicago's building activity would have ceased.

From the growing scarcity of cars, it became evident early in February that we could no longer meet the demand for cement through shipments over the railroads. The extensive building program of the city, hard hit last season by the strike and lockout in the building trades, and later by the lack of aggregates, apparently was about to meet with another serious obstacle in a shortage of cement. But realizing that it was entirely a matter of transportation, we investigated the possibilities of truck hauling, knowing that a good route, paved much of the way with concrete, led from the cement plant to Chicago's street system. By the middle of February conditions became so acute that we began cement hauling with 30 of our 7½-ton Mack trucks.

Truck and Trailer Outfit Carries One Hundred Barrels Per Trip

Throughout the early spring when unimproved roads are simply impassable for heavy hauling, our big trucks carried 200 sacks of cement on each trip to the city. Several of the trucks were equipped with trailers, and on these the load was doubled to 400 sacks, or 100 barrels. Only a few years ago this made a minimum car load, but of course much heavier loading has been the rule of late.

Sunday, May 2, with a fleet of 45 trucks, we hauled 115 loads from Buffington, a total of 5820 barrels of cement. We did this without the necessity of our having any calls for service in the garage. This appears to be a very fine record not only from a hauling but also service standpoint, as the trucks were under heavy strain the entire day loading to maximum capacity.

As the building season advanced, more and more work opened up until our trucks were applying approximately one hundred jobs. As rail shipments were entirely out of the question during the terminal tie-up in April, and practically so for the remainder of the time, the progress of these jobs and the employment of hundreds of workmen depended upon the continuity of our truck deliveries.

When the Importance of Good Roads is Realized

In all, 30 or 40 other dealers and a few contractors were also hauling from Buffington on a smaller scale. Cement was delivered in all parts of Chicago and many of the surrounding towns, with hauls ranging up to 37 miles. The approximate distance to the loop in Chicago is 25 miles. When one considers the great volume of building work dependent upon this truck hauling, and the probability of similar situations in other industries, the construction of paved, connecting highways takes on renewed importance.

The Universal Portland Cement Co., which operates the Buffington plant, has given out as typical these figures on the volume of cement shipments on a day in February: By rail approximately 5600 barrels were loaded in 28 freight cars, while 9000 barrels went out in 192 motor trucks.

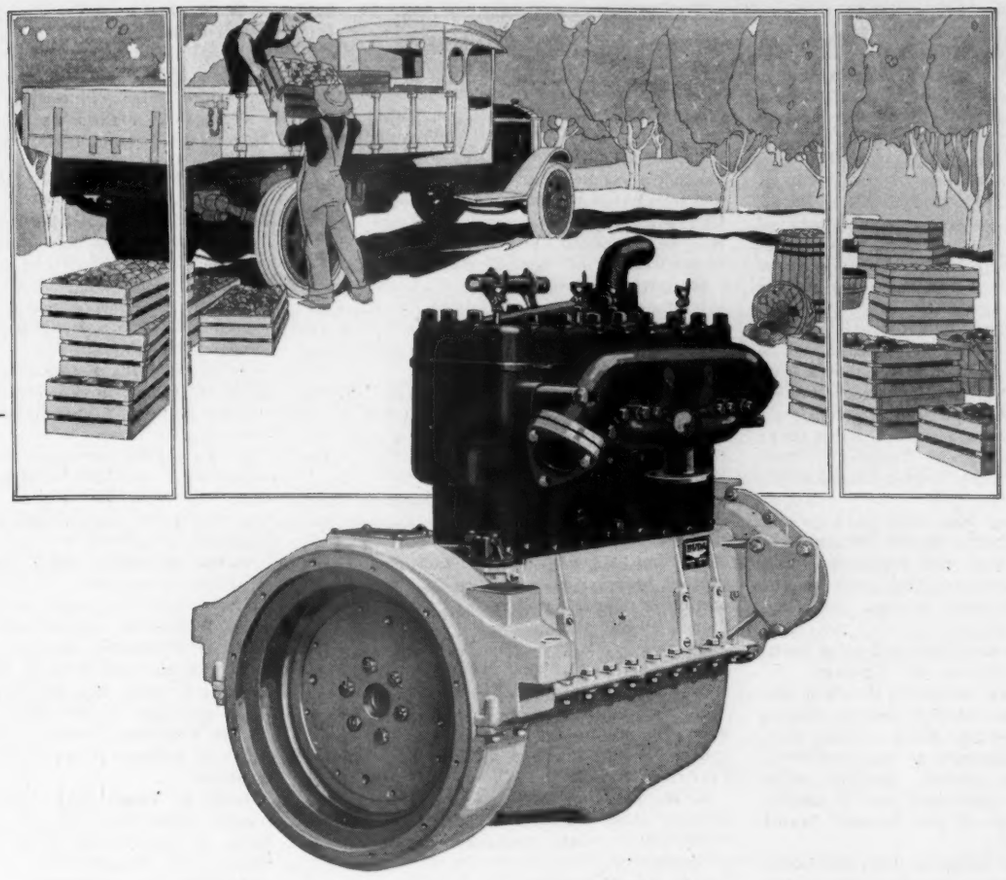
Naturally every care is taken to keep our trucks in efficient working condition under this severe usage. No new methods have been found necessary, however, as in our other heavy hauling operations we have worked out a plan of operation and careful maintenance that is rigidly adhered to with our entire fleet, now numbering more than 100. Our 7½-ton trucks are governed to a speed of 10 miles an hour, as we have learned that operating at a faster rate does not pay. But at this speed, we find that each truck can carry up to 10 tons on pavements without injury to the machine.

Every night after the trucks are in the garage two gangs of men go over them thoroughly. For every 10 trucks we have one washer and one greaser, and the work these men do is carried out in no perfunctory manner. Washing the trucks, using kerosene where it is needed, keeps grit from working into the delicate running parts of the machinery. Our oilers have instructions to see that grease is fairly oozing out of every working part, and apply it to nuts and bolts as well. Each night the sides of the springs are painted with waste oil, and as a consequence we have no springs with the leaves rusted together, and our spring repair bills are practically nothing. This will furnish an idea of the care given our trucks so that they can be depended upon for service day after day. **We find that it pays.**

Responsibility for delivering cement, and indeed all other materials as well, is placed upon Transportation Department. Each morning the superintendent of garages reports to the central office what disposition has been made of the equipment. By means of colored tacks this information is graphically shown on the schedule or dispatch board that hangs in the office of the transportation manager.

Orders Received From Main Office Dispatcher

All of the trucks used in cement hauling check in at our yard 204 located 7650 So. Chicago Ave., where they receive orders from the main office dispatcher for deliveries and again communicate with the dispatcher at the point of delivery for further orders. In this way we are in continual touch with our drivers as they communicate with our dispatching office, from Buffington, our yard 204 and from point of delivery, and we are thus able to eliminate practically all of the unproductive mileage which of course proves costly and unprofitable.



FROM the beginning Buda engines have been built to satisfy the discriminating truck manufacturers who believe prompt and sustained hauling power is more important than engine price.

Consequently, the Buda has always been a quality engine. Each shaping operation is held to exceedingly close limits and two stringent test-block trials assure the smooth-running adjustment of the assembled unit.

In the heaviest city traffic as on long cross-country hauls the Buda engine has demonstrated the worth of this painstaking workmanship and unvarying performance quality.

Confidence in the Buda engine's capacity for thrifty, trouble-free service has led to its selection as the standard power plant for 87 of America's representative automotive products.

THE BUDA COMPANY, HARVEY CHICAGO SUBURB ILL.
ESTABLISHED 1881

BUDA
The
ENGINE

Personal Items

B. E. Aaronson has succeeded M. S. Lines as sales manager of the Gordon Tire & Rubber Co., Canton, Ohio. For the past three years he was special sales representative of the Mohawk Rubber Co., and has also been with the sales departments of the Empire and the Goodyear factories.

R. L. Armstrong has been appointed manager of the Omaha branch of the Pennsylvania Rubber Company, of Jeannette, Pa.

James E. Baird, advertising manager of the General Motors Truck Co., and **W. B. Green,** of the Green, Fulton, Cunningham Co., are making an intimate survey of the mid-west farming section.

L. M. Baker has resigned as supervisor of sales of the motor equipment division of the Hyatt Roller Bearing Co., to become Michigan representative of the Dittmer Gear & Mfg. Co., with headquarters in Detroit.

A. C. Bergmann is now general sales manager of the Sterling Motor Truck Co. Formerly he was New York branch manager for Standard Parts.

Millard S. Binney has become publicity manager of the Traffic Motor Truck Corporation. Mr. Binney was connected with the Chalmers Motor Company prior to the war, and returned from Europe last September.

D. S. Campbell is secretary and sales manager of the Tuthill Spring Co., Chicago.

J. Parke Channing succeeds the late Mr. Douglas as president of the Duplex Engine Governor Co., Brooklyn, N. Y. Walt Talcott succeeds Mr. Channing as vice-president.

Charles C. Craig, former general sales manager, has been promoted and is assistant to the president of the Stewart Motor Corporation, Buffalo.

S. B. De Keim has resigned from the Locomobile Co. of America, as manager of the New York branch, to become general sales manager of the American works at Springfield, Mass., of the Rolls-Royce, Ltd.

Ralph B. Dort, supervisor of foreign agencies for the Dort Motor Car Co., has left for the Far East on an eighteen months' trip.

Robert S. Fletcher has been appointed manager of sales and **Frank B. Wilson** publicity manager, of the Climax Rubber Co., Columbus, Ohio.

Charles W. Doane has been appointed Detroit representative of the Automobile Equipment Department of the Westinghouse Electric & Mfg. Co., with offices at 1109 Kresge Building, to succeed L. B. Fijux, resigned. Mr. Doane was for many years in charge of the Westinghouse Automobile Service Department for the Detroit district, and is succeeded by A. B. Junker.

George Feher, for six years with the sales staff of the American Ever Ready Works, has been appointed assistant sales manager of the Moto-Meter Co., Inc., Long Island City, N. Y., makers of the Boyce motometer.

Christian Girl, former president Standard Parts Co., is heading a new company which has purchased the Kalamazoo Spring & Axle Co., Michigan. Automobile springs chiefly will be produced, and Mr. Girl will be in direct charge of the company.

Morgan Harding has resigned as Detroit sales manager of the Aluminum Manufacturers, Inc., Detroit, and is interested in the Coe-Stately Mfg. Co., West Haven, Conn., and will handle its sales.

E. V. Hennecke, sales manager of the Moto-Meter Co., Long Island City, N. Y., is on an extended western trip, including attendance at the Jobbers' Convention, Del Monte, California.

Alfred J. Jackson has been elected president and director of sales of the Jacquet Motors Corp., Belding, Mich.

Anthony Kayser is the factory branch eastern representative of the Highway Trailer Co., of Edgerton, Wis., at 238 S. Eleventh Street, Philadelphia.

Charles H. Kip is now in charge of the export business of the Transport Truck Co. His thorough acquaintance in foreign countries, and twenty years in the export business in steamship, railway and export houses, should prove a distinct asset to the Transport Truck Co.

G. M. Knowles has been made southern division sales manager for the Sanford Motor Truck Co., with headquarters temporarily in Baltimore.

I. C. Lamb has been made sales manager of the Automatic Light Co., Inc., Ludington, Mich., makers of the Holt Power Light Unit.

Ralph W. Leavenworth, for about two years assistant advertising manager, has become advertising manager for the Standard Parts Company.

Frank B. Longnaker, former general superintendent and sales manager Banner Machine Co., and for eight years in charge of the Goodyear Tire & Rubber Co. machine shop, is now general supervisor of the tire mold, cores and rubber mill equipment department recently taken on by the Reynolds Machine Company, Massillon, Ohio.

W. J. McIntyre, special factory sales representative of Splitdorf Electrical Company, formerly at Cleveland, now has his headquarters at the Newark factory. He will continue to handle the same territory in Ohio and Indiana as before.

W. F. McLaughlin, who has been general superintendent of the Hyatt bearing division, General Motors Corp., has taken the position of works manager for the Ace Motor Corporation, Philadelphia.

Robert E. Mackenzie has been appointed advertising manager of the Timken Roller Bearing Co.

R. C. Merchant, sales manager of Covert Gear Co., Inc., has moved his headquarters from Detroit to Lockport, N. Y., where the sales, engineering and service departments of the company will be centralized. The company's Detroit offices in the Hayward building, 967½ Woodward Avenue, will be continued in co-operation with the Lonney & Carmichael Sales Co.

John H. Mills, senior member of the sales staff of the Hilo Varnish Corp., has been elected vice-president. He has been with the company 36 years.

C. B. Morse has been appointed general advertising manager of Hare's Motors Company, 16 West 61st Street, New York. He was formerly advertising manager for the Packard Motor Car Co.

Ralph Murphy, chief engineer of the Franklin Automobile Co., Syracuse, N. Y., for a number of years, is now assistant to John Wilkinson, vice-president.

M. J. O'Connor, for the past four years with the McLean Tire & Rubber Co., East Liverpool, Ohio, has been appointed general sales manager in the New England States, at 119 Chandler Street, Boston, under the name of McLean Tire & Rubber Co. of New England.

John B. Page, who was until recently foreign sales manager of the Traffic Company, is now foreign sales manager of the Okay truck manufactured by the Oklahoma Auto Mfg. Co., Muskogee, Okla.

G. G. Power, general sales manager of the General Aluminum & Brass Mfg. Co., announces that the company has purchased all the stock of the McAdamite Company, Detroit.

D. T. Preyer has become district sales manager for the middle-west district, including Michigan, Indiana, Kentucky, Illinois and Wisconsin, for the American Hammered Piston Ring Co., Baltimore.

N. S. Reed, formerly truck engineer of the Paige-Detroit Motor Car Co., has joined the Hinkley Motors Corp. as consulting engineer of the sales division.

E. F. "Eddie" Roberts, who joined the Packard Motor Car Co. seventeen years ago as a tool maker, has been appointed vice-president in charge of advertising.

Edw. K. Roberts has been made general sales manager of the Stewart Motor Corporation, Buffalo, N. Y.

Arthur J. Steel

Many years with the Auto Car Co., now with the Gramm-Bernstein Motor Truck Co., Phila. Will establish agencies in eastern Pa. and N. J.

Kenneth Cloud

President Cloud Accessories Corp, 1408 South Wabash Avenue, Chicago, makers of Morgan cord fan belts, transmission linings and spark plugs.

Charles R. Newby

Recently appointed general sales manager of the Bethlehem Motors Corporation, Allentown, Pa.

C. S. Whitney

District manager of wholesale sales, Detroit, for the Willard Storage Battery Company.

Continuous performance is what counts

ASK any garage repair man and he will tell you that worn bearings have helped build his overhaul business. Ask any automotive engineer and he will say that machine life—the ability to deliver a full quota of horsepower hours—depends vitally on bearing performance.

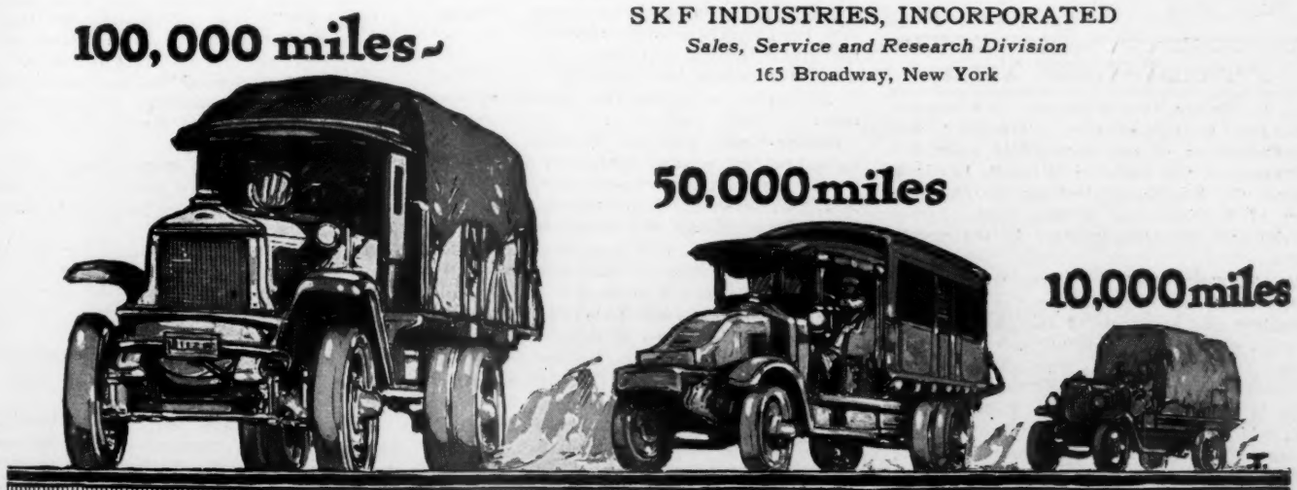
For just as soon as the bearings in your truck start to wear, lost motion causes destructive vibration that quickly hammers the internal parts into a state of inefficiency. The result is lessened economy, higher maintenance cost—early destruction, particularly of transmission and drive.

The fact that practically all the leading truck manufacturers place ball bearings at the points of greatest possible wear is convincing evidence that this form of bearing wears longest. Under proper conditions of selection and use, ball bearings should not wear at all—normal car life considered. And it is significant that S K F and HESS-BRIGHT ball bearings are built into the vehicles of the majority of the better truck manufacturers.

In S K F and HESS-BRIGHT ball bearings we have not only developed the anti-friction bearing to its highest perfection, but we have further established a scientific research and engineering organization that is shouldering the automotive manufacturers' bearing problems. We are endeavoring to serve American industry through this contribution to the building of better trucks.

Manufacturers are invited to avail themselves of this freely offered co-operation

S K F INDUSTRIES, INCORPORATED
Sales, Service and Research Division
165 Broadway, New York



SKF INDUSTRIES

Hess-Bright Ball Bearings
S K F Ball Bearings
Atlas Steel Balls
Gronkvist Chucks
Transmission Hangers

596

The S K F Research Laboratory where friction problems are solved

E. A. Samels, who joined the sales department of the Four Wheel Drive Auto Co., Clintonville, Wis., has been made assistant sales manager.

George S. Shugart, general sales manager of the United States Tire Co., has been elected vice-president.

Daniel O. Skinner, for the past six years advertising manager of the International Motor Company, New York, has joined the Buffalo division of the Monternach Company. His experience and ability in planning and carrying through large advertising campaigns will be devoted to the development of industrial and automotive accounts in Buffalo territory.

E. T. Sutton has become advertising manager of the Denby Motor Truck Co.

G. A. Ungar has been appointed general Flexite sales agent and consulting engineer of that department by Slocum, Avram & Slocum, Newark, N. J. His headquarters and the general Flexite sales offices are in the Woolworth building, New York.

L. E. Wagner, corporation sales manager for the Diamond T Truck Co., Chicago, has resigned to accept the same work for the Oneida Motor Truck Co., Green Bay, Wis.

P. B. Williams, general sales manager of the Mac-Lar Battery Co., has resigned to accept the presidency of the Barco Battery Co., makers of the Bearcat battery for starting and lighting.

R. S. Willis, general purchasing agent, and H. V. Strawn, assistant advertising manager, are now in charge of the advertising of the United States Rubber Co.

George Zwergle, formerly factory representative of the Republic Truck Co., has been appointed director of sales for the newly-organized Transport-Utilitor Sales Co., in Toledo, Ohio.

Personal—Retail Trade

J. L. Brown, vice-president and general manager, announces the enlargement and reorganization of the automobile sales department of the Spokane Mitchell, Lewis & Staver Co. branch, controlling the distribution of Mitchell and Jordan cars, Jumbo trucks and Monarch tractors in the northwest.

W. H. Diefendorf, who was thirty years with the New Process Gear Corp., is now president and treasurer of the general commercial gear jobbing firm of Diefendorf Gear Corp., 118 Dickerson St., Syracuse, N. Y.

The Federal Motor Truck Co. of Philadelphia is the new name of the Federal Sales Co., which is now a factory branch, and in charge of William H. Bartleman. His territory is eastern Pennsylvania, southern New Jersey, Delaware and eastern Maryland.

The Multibestos Company, Walpole, Mass., brake lining and clutches, have opened a New York branch office at 105 West 63rd Street.

A. Mason Gibbes, president of the South Carolina Automotive Trades Assn., is state distributor of Packard and Paige cars.

J. C. Phelan has sold to the H. O. Harrison Co., his agency at San Francisco, and the transaction involves a ten-year lease at a rental of $70,000.

E. V. Plane has become sales manager of the G. Norman Baughman Co., Tampa, Fla.

Charles E. Roney has been made sales manager of the Starkweather Company, Detroit, distributors of Artcraft tops in Michigan, and northern Ohio and Indiana.

M. E. Ryan has been appointed sole distributor of the Lapeer Trailer products, with general sales offices at 2807 S. Michigan Avenue, Chicago.

The Schlemner & Graber Motor Car Co., truck distributors, Canton, Ohio, are building a $100,000 garage and service station on Twelfth Street.

T. M. Van Dusen has purchased all the holdings of D. S. Childs, former president of the B. V. Motor Sales Co., Flint, Mich., and has been made treasurer and director. Capitalization has been increased to $100,000.

New Agencies

J. Maurice Willitts, for twelve years selling Dixon's automobile lubricant in Philadelphia, has been made distributor of these products for Philadelphia, southern Pennsylvania, Maryland, Delaware and southern New Jersey.

The United Sales Co. has moved from 2035 Market Street, to 4830-34 Market Street, Philadelphia, and have been made distributors for the Huffman six-passenger car and the Huffman two-ton truck. Everett Cummins is president and treasurer, and George C. Henderson, vice-president and sales manager.

Holden-Kent, Lincoln Building, Detroit, have been made sales agents for the United States east of the Mississippi for the Higgin Mfg. Co., Newport, Ky., makers of automobile body moldings and stampings.

Nelson & Price, Los Angeles, have taken over the distribution of India tires in southern California and New Mexico.

The Timken-Detroit Axle Co. announces an eastern sales office in the Post-Standard building, Syracuse, N. Y., in charge of Gordon H. Gannett and L. S. Wiggin. After May 3 the Chicago sales office of the company will be at 1403-05 Conway building.

The Welling Motor Co., distributor of the Crow-Elkhart passenger car, and the All-American truck, has been appointed distributor for eastern Missouri, southern Illinois, Arkansas and Tennesse, for the Leader crawler and four-wheel tractors.

Standard Motor Trucks have had distributors appointed as follows: The General Commission Co., Toronto, Ont., are distributors for eastern Canada. The Manhattan International Corporation, New York, will distribute Standard trucks in the sections of the North Atlantic and New England States not already covered by present distributors. The P. S. Car Motor Company, Atkinson, North Carolina, will be the Standard dealers for the territory adjacent to Atkinson. The territory in the neighborhood of Sulligent, Alabama, will be handled by the Kennedy-Maddox Motor Company of that city.

Messrs. Don Chemberlin, former secretary of the Des Moines Motor Trades Bureau, and **W. N. King,** recently with the Firestone Tire and Rubber Co. at Des Moines, have taken on 57 counties in Iowa for the Bell motor truck and will be distributors in that territory.

Lawrence L. Gilday, who has been with the sales force of the T. S. Bunn Co., Bloomington, Ill., has been appointed distributor for the Packard at Springfield, for that territory.

The Roller-Smith Company, 233 Broadway, New York, announces an agency arrangement with the W. Montelius Price Company, 524 First Avenue, South, Seattle, Wash.

The W. S. Kip Motor Co., Philadelphia, and the H. D. Shawkey Motor Co., Pittsburgh, have been appointed distributors for the Dort car.

Removals and Trade Changes

Tracy-Parry Co., advertising, has moved to larger quarters at 347 Fifth Avenue, with Frederic H. Lovejoy as office manager.

The Black & Decker Co. has moved from West End Trust building, Philadelphia, to larger quarters at 318 North Broad Street. W. C. Allen is manager.

The H. J. Koehlers Motor Corp., formerly at Fourth Avenue and Ogden Street, Newark, N. J., is now in its new plant, Bloomfield, N. J.

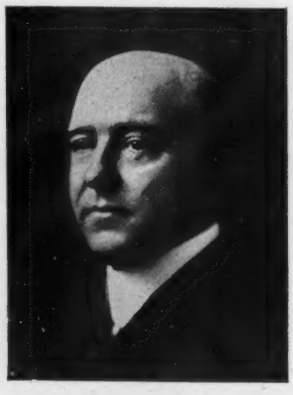
Mallory, Mitchell & Faust have changed their corporate name to Mitchell-Faust Advertising Co., and are in new and larger quarters in the Tribune Building, 7 South Dearborn Street, Chicago.

The Brandt Advertising Co. have moved to the fourteenth floor, Tribune Bldg., 7 South Dearborn Street, Chicago.

Cross & Simmons, Inc., 117 N. Dearborn Street, has been changed to The Simmons Associates, Inc. H. H. Simmons is president, and John H. Cross is vice-president.

C. E. Murray
Who is district manager of wholesale sales, Willard Storage Battery Co., Chicago, Ill.

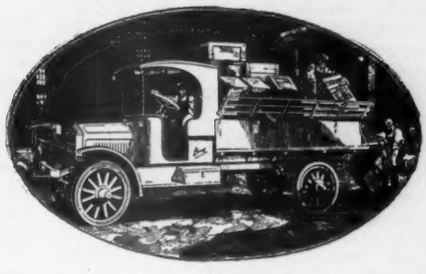
E. A. Samels
Assistant sales manager Four Wheel Drive Auto Co., Clintonville, Wis.



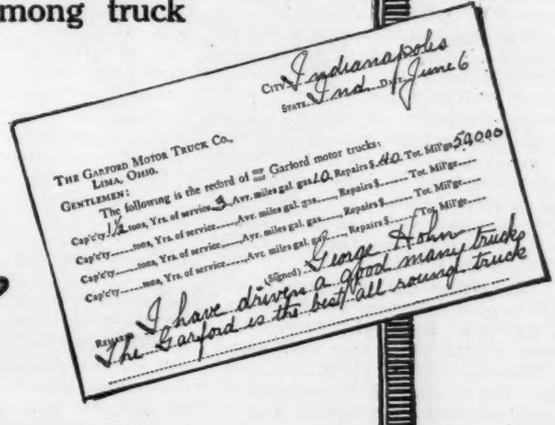
F. C. Gilbert
President and treasurer of the Vulcan Axle Co., Detroit, a $1,000,000 enterprise.

Clifton C. Slusser
Production manager Goodyear Tire & Rubber Company's new plant, Los Angeles, Calif.

GARFORD



THAT the Garford franchise is sought by a growing number of reputable dealers, is because Garford *Low Cost Ton-Mile* is a matter of common knowledge among truck buyers.


City Indianapolis
State Ind. Date June 6

The Garford Motor Truck Co.
Lima, Ohio.

Gentlemen:
The following is the record of our Garford motor trucks:

Cap'c'ty 1½ tons, Yrs. of service 3 Avr. miles gal. gas 10 Repairs $ 40 Tot. Mil'gs 54000
Cap'c'ty ____ tons, Yrs. of service ____ Avr. miles gal. gas ____ Repairs $ ____ Tot. Mil'gs ____
Cap'c'ty ____ tons, Yrs. of service ____ Avr. miles gal. gas ____ Repairs $ ____ Tot. Mil'gs ____
Cap'c'ty ____ tons, Yrs. of service ____ Avr. miles gal. gas ____ Repairs $ ____ Tot. Mil'gs ____

Remarks: I have driven a good many trucks
The Garford is the best all around truck

(Signed) George H. Johnson

Garford

Lima, Ohio

Returns from a recent investigation among 4,000 Garford owners show 97.6% are 100% satisfied.

TRUCKS

The Canadian Briscoe Motor Co., Limited, has moved its head office from Toronto to its factory, at Brockville, Ontario.

The Black & Decker Mfg. Co. has moved its Cleveland branch office from 6523 Euclid Avenue to 6225 Carnegie Avenue.

The Mueller Electric Co., Cleveland, has moved from 423 High Street into their new location, 2139-43 Fairmount Road.

Factory News and Capital Increases

The Clark Equipment Co., Buchanan, Mich., makers of internal gear axles and steel truck wheels, continues this year its custom of granting vacations with pay for all employees of one year. One week with full pay is allowed.

The Splitdorf Electrical Company has transferred the New York branch, formerly located at 3 West 61st Street, to the main office, 98 Warren Street, Newark, N. J. The Splitdorf company will, however, maintain a New York City office at 225 West 57th St.

The Atlas Truck Corporation has elected the following new directors: A. R. Cosgrove, Reeve Schley, F. M. Small, Oscar Gubelman, Herbert S. Carpenter, D. D. Sargent, John J. Watson, Jr. The following were elected officers: John J. Watson, Jr., president and chairman of the board of directors; A. R. Cosgrove, vice-president and general manager; Henry Hopkins, Jr., vice-president; Thomas Strauss, assistant treasurer; E. J. Sheppard, secretary.

The Canton Rim Co., Canto, Ohio, makers of demountable rims, has increased its capital from $100,000 to $500,000. Plant improvements and additions will double the present output. J. F. G. Graber is president, and James Litsinger, vice-president.

The Dort Motor Car Company's new plant, to occupy seventy acres at Flint, Mich., is going up. The first unit is expected to be ready in August, when work upon the second unit will be begun.

The Federal Motor Truck Co. has purchased sixty acres inside the city limits of Detroit, with half a mile frontage on the Detroit Terminal Railroad. All freight loading and unloading will be done inside the plant. Pending completion of these new plans a new plant unit will be erected at the present Federal works, providing for about 70,000 additional sq. ft.

The Briscoe Motor Car Company's net earnings for its past fiscal year were $904,713, with total assets of $6,880,147. During the calendar year of 1919, 12,000 cars were made and sold. Thus far in 1920, 20,000 cars have been booked, and production is expected to be 25,000 cars, or more than double that of 1919.

The Hayes Wheel Co., Jackson, Mich., has filled to capacity the entire plant at Jackson, formerly occupied by the Mutual Motors Corp., as well as the plant once used by the Reinforced Concrete Pipe Co. The machine tool maintenance division builds, and also rebuilds, all the machinery for the five factories.

The Willys-Overland Co. has bought 50 acres in Fostoria, Ohio, on which a large ignition plant will be built.

The Splitex Radiator Co., with a recent $1,000,000 increase in capital, contemplates removing to Baraboo, Wis., from Racine.

The Victor Motor & Clutch Co., W. L. Withers, president, will produce from its factory in Denver, Colo., a one-ton "foolproof" Victor gearless transmission truck.

The Oshkosh Motor Truck Mfg. Co., makers of the Oshkosh 4-Wheel Drive truck, has broken ground for a new factory, 130 x 450. Another 75 x 100 structure is also going up.

The Washington Steel & Ordnance Co., Washington, D. C., with factory buildings covering 25 acres at Giesboro Point, D. C., has entered the automobile parts field. Claude C. Ostrum, formerly sales manager, has been made general manager, and Brock Mathewson has been made sales manager of passenger car and truck parts sales.

The Vesta Battery Co., formerly the Vesta Accumulator Co., announces an issue of 7 per cent. cumulative preferred stock to the amount of $450,000, and 30,000 shares of common stock.

The Overland Tire & Rubber Company's new plant at Omaha is completed and 200 tires and 500 tubes are produced daily.

The Monroe Steel Castings Co., Monroe, Mich., has been purchased by a group of Detroit men, who are now operating the plant under the management of Carl F. Clarke, president of the new company. The plant makes high grade steel castings by electric furnace process.

The Comet Automobile factory, Decatur, Ill., recently shipped forty cars in one consignment to Antwerp, Belgium. Boxing and freight from factory to destination costs $650 per car, additional to the selling price.

The Winther Motor Truck Co., Kenosha, Wis., has closed a contract for the delivery of 1000 Winther trucks of the four-wheel drive type within sixteen months, for use in the field work of the American Telephone Co.

The Stewart-Warner Speedometer Corp. announces that it will absorb the Stewart Mfg. Corp. by an exchange of stock, share for share. Seventy per cent. of the dies, castings and machinery made by the manufacturing company are used by the speedometer firm.

The Service Motor Truck Co. held its sixth annual sales convention at Wabash, Ind., with more than three hundred dealers present, including a good number of foreign distributors.

The Stevenson Gear Co. announces that it will take immediate steps toward the erection of a $1,000,000 plant in Indianapolis for the cutting of commercial gears by the patented Stevenson multiple process. Thomas J. Stevenson is president; George R. Stevenson, vice-president; George E. Stevenson, secretary and general manager.

The Curtis Tire & Rubber Co. suffered a fire loss of $750,000 in its Muskegon, Mich., plant, May 4. Many employees had to jump from windows. Temporary quarters have been secured and production continued as far as possible, while rebuilding, including enlargement of the plant, is accomplished.

The Rex Machine Company, Chicago, manufacturers of the Wizard power driven tire pumps, has changed its name to the Sundstrom Manufacturing Company. Capital has been increased to $100,000, fully paid in. New machinery has been installed, enabling greatly increased production. Officers, personnel and management remain the same.

The Oneida Motor Truck Co., Green Bay, Wis., is to be reincorporated in Delaware, and capital increased from the present $600,000 to $7,500,000.

The Union Pacific Railroad has purchased the holdings of W. R. McKeen in the McKeen Motor Car Co., and now holds practically all the stock. The car company makes an engine-driven passenger car for interurban travel.

The Michelin Tire Co., with the last change in tire prices, no longer sells a higher priced tire. Two new factory buildings have been completed, two others will be ready next year, and the company has twenty-eight factory branches, including new ones in Memphis, Charlotte, New Orleans, Omaha and Lynchburg, Va. The Atlanta branch employs thirty-seven field men.

The Vim Motor Truck Co., Philadelphia, has bought the Midvale gun plant at Wayne Junction, within the Philadelphia city limits.

The Vulcan Motor Axle Co., Detroit, capitalized at $1,000,000, will build a complete line of axles for motor vehicles. A large modern plant has been obtained in Detroit, and machinery and equipment has been received for complete installation, which is going on rapidly. Production starts early in the fall. F. C. Gilbert is president and treasurer; R. B. Weaver, vice-president, together with Sidney C.. Love and C. C. Miller; J. T. Hanlon is secretary; R. G. Beechler, chief engineer.

The Dayton Body & Cabinet Co. has taken over the Colonial distillery buildings near Xenia, Ohio, and will manufacture commercial car bodies. Capital is $50,000.

The Duesenburg Automobile & Motors Corp. has bought a factory site in Indianapolis and plans 2400 cars the first year of operation. In addition to a special Duesenburg engine the car will be equipped with four wheel brakes and an axle designed by Fred S. Duesenburg. The new car is stated to be 400 lb. lighter than those of similar power and will obtain from 18 to 22 miles on a gallon of gasoline. $500,000 of stock has been sold to car dealers throughout the country.

The Russell Mfg. Co. will increase its stock from $900,000 to $2,000,000.

Hamilton Motors Co., Grand Haven, Mich., has increased its capital from $500,000 to $1,500,000.

B. F. Goodrich Co. sales in March were at the rate of $220,000,000 a year, and are now producing at a volume 55 per cent. greater than last year's sales.

The Stevens-Duryea, Inc., Chicopee Falls, Mass., will receive, on contract, $1,000,000 worth of bodies from The Baker R. & L. Company for their new Stevens-Duryea, which will be one of the highest priced passenger cars produced in America. The company furnishing the bodies is just completing a $3,000.000 body contract for the Reo company.

The Union Motor Car Corp., Eaton, Ohio, has purchased a site and will build a factory. An assembled passenger car will be placed upon the market by the firm, which has capital of $1,000,000 under Delaware laws. R. M. Shipley is treasurer and general manager. Albert H. Christman, president.

E. I. duPont de Nemours & Co. and the **Flint Varnish & Color Works,** of Flint, Mich., have jointly purchased the Chicago Varnish Company. No radical change in factory or sales organization is contemplated.

The Spicer Mfg. Corp. has acquired control of the Salisbury Axle Co., one of the oldest motor car axle makers..

The Wohlrab Gear Co., Racine, Wis., has bought an acre of land and the factory buildings of the Shartow Mfg. Co., to provide additional facilities.

The Bergougnan Rubber Corporation, Trenton, N. J., has started work upon substantial expansion of its manufacturing facilities. A quarterly dividend of 1¾ per cent. has been declared on the preferred stock.

The Cloud Accessories Corp., Chicago, has been organized to produce Morgan fan belts, transmission lining for Fords, and spark plugs. Kenneth Cloud is president, and the location is 1408 South Wabash Ave., Chicago.

The Ideal Tire & Rubber Co.. Cleveland, announce an increase of 300 Greyhound tires a day beginning June 1, when factory addition will be completed.

The Pan Motor Co.. Minneapolis, organized by Samuel G. Pandolfo, has been authorized by the Minnesota Securities Commission to sell $2,000,000 worth of stock for manufacturing purposes and working capital.

MARTIN
CUSHION WHEELS
FOR MOTOR TRUCKS

No Bolts
No Nuts
Pressed on
Throughout
Light
Strong
Resilient
Durable

Backed
by
Nine Years'
Experience
in Building
Good
Cushion
Wheels

Adopted for Standard Equipment on
"OLD RELIABLE" MOTOR TRUCKS
1½ to 7 Ton

MARTIN CUSHION WHEEL CO.
311-13 N. SANGAMON STREET CHICAGO, ILLINOIS
BRANCHES AND SERVICE STATIONS IN ALL PRINCIPAL CITIES
PRICES ON REQUEST

New Incorporations

The Gotfredson-Joyce Corp., Ltd., formed to manufacture trucks, has taken over the Gramm plant at Walkerville, Ontario, and will turn out 1000 2½-ton trucks during 1920.

The Field Mfg. Co., designers and builders of truck bodies, Owosso, Michigan, has been incorporated by its owner, J. F. Field, who becomes president. E. J. Frederick is vice-president and treasurer. A. L. Ditter is general sales manager; S. Hugh Paine, advertising manager. Elaborate plans, now under way, will triple capacity through additional buildings and enlargements.

The Penn Securities Corp., with fully paid in capital of $1,000,000, has been formed in Uniontown, Pa., to finance purchasers and dealers in automobiles and trucks. A similar company was recently organized in Ohio.

The Virginia-Carolina Rubber Co., Inc., has been formed at Richmond, with capital stock $50,000 to $200,000, to manufacture and deal in tires and rubber goods. R. J. Bell is president, and Charles L. Shackleford, secretary.

The Piston Ring Castings Co., Cleveland, has been formed with capital from $25,000 to $100,000.

The Menges Motor Co., with authorized capital of $1,000,000, has been organized in Greenville, Miss., for erection of plant, and production of the Menges truck, designed by A. C. Menges.

The Four Wheel Drive Auto Company's stockholders, Clintonville, Wis., have purchased the Menominee Motor Truck Co., Michigan, and have incorporated as the Menominee Motor Truck Company of Wisconsin. The plant of the new company will be located in Clintonville. Capitalization is $500,000.

Obituary

Edwin C. McGraw, founder and president of the McGraw Tire & Rubber Co., East Palestine, Ohio, died at his southern home, Point View, Miami, Florida, on May 24, aged 61.

Theodore C. Fedders, president of Fedders Mfg. Co., died at his home in Buffalo, N. Y., May 2, aged 67. He was one of the pioneer makers of automobile radiators. Four sons carry on his business.

John W. Hyatt, inventor of the Hyatt roller bearing, and also the inventor of celluloid, died of heart disease at Short Hills, N. J., May 10.

Association News

Le Mars, Iowa, Auto Dealers' Association has been formed, with Nick Mertes as secretary. Dealers in Akron, Kingsley, Remsen, Hinton and Merrill will be urged to join.

Litchfield County, Conn., Auto Trade Assn. has elected C. B. More, Winsted, secretary, and N. D. Holbrook, Thomaston, president.

The National Traffic Officers' Association meets in San Francisco, August 23 to 27, the object being the standardization of traffic rules throughout the United States and Canada, together with the universal adoption of the best safety first measures developed in the various cities.

McCord Manufacturing Co., Inc. A pictorial description of its various plants and products, is a de luxe, plate-paper 9 x 12, 27-page announcement, with 47 reproduced photographs and wash-drawings. There is descriptive text, list of customers, and table of pertinent facts. The McCord Company's plants cover 24½ acres, with total floor space of 1,186,000 sq. ft., and there are 4000 employees.

Another Boost for Truck Transportation

A fund of $500,000 has been pledged by more than two thousand members of the New York City Merchants' Association to finance an independent trucking corporation to relieve the tie-up of freight in the city resulting from strikes of various labor organizations. Shipping is crippled in the Metropolis. The merchants have been forced to act. They are not parties to the quarrels between the unions and the shipping concerns, but the unions refuse to permit them to move goods from piers on which there are strikes to their warehouses or from their warehouses to the piers. In effect the unions assume the right to isolate any ship or pier in case of labor difficulty and deny the privilege to any merchant to do business with a firm, company or corporation against which a strike is under way. Meanwhile, other ports are getting much of the commerce that ordinarily flows through New York.

Resolutions were adopted urging Federal, state and municipal officials to take action that will bring "this intolerable situation to an end."

What Can be Done!

Statistics on automobile production and automobile thefts in the year 1919 are now available, and it is an almost unbelievable fact that for every five cars produced, one was stolen.

The federal law lately enacted which makes running a stolen automobile across a state line a very serious offense may reduce this proportion in 1920. Thieves seem to laugh at locks and laws.

As police regulations forbid the use of any device which prevents towing, the thieves can come boldly along and tow a car to a confederate's garage.

Hanging was the one thing that discouraged horse thieves. We are not making any recommendations, but merely remark that a car is more valuable than a horse.—*Timken*, Timken Roller Bearing Company.

It takes more than 200 million tons of hogs, cattle, sheep, corn, rye, wheat, barley, oats, and other food products yearly to keep this nation alive. This means that two tons of food must be transported one or more times for every man, woman, and child. This one fact alone shows how vital transportation is to our very existence.

The country needs more freight cars, more locomotives, improved dock and terminal facilities, deepened waterways, hard-surfaced roads. Only united, concentrated effort will get them. Federal, state, and municipal authorities acting in harmonious concert with banking and transportation representatives could go a long way in solving this problem so vital to the future of this country.

To increase its business to correspond with the demands made upon it, the General Motors Acceptance Corp. will double its capital and surplus from $2,500,000 to $5,000,000, with capital stock at $4,000,000.

Huge Special Van for Suburban and Intercity Hauling Used by the Cathcart Company

Two large vans built to the specifications of the owner of the Cathcart Company, completely equipped with electric light, horn, water cooler, etc., and built on Federal trucks here have recently been added to the fleet of the Cathcart Transfer & Storage Co., engaged in suburban and intercity hauling. Both jobs have double walls reinforced with steel, front and side doors, lockers and accommodations for six persons and their luggage on the driver's seat. These provisions are essential, as the activities of these trucks extend over a large radius.

ATLAS WHEEL CRANE

Always ready for work. Does not get out of order. Requires no special care. Will last a lifetime of reasonable use.

Simple in Operation

The grab hooks grip the steel rim on each side. The wheel is hoisted free of the axle by a few turns of the crank. The crane with the suspended wheel is then rolled back from the truck. That's all.

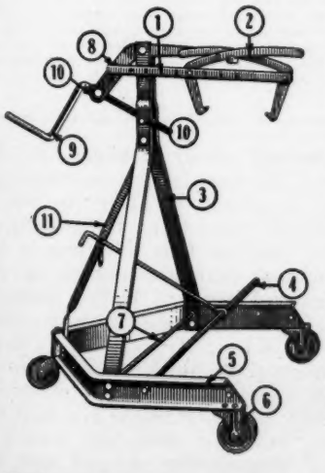
The crane holds the wheel vertically. To remount, simply roll the crane to the axle and slip the wheel into place with one easy motion. Turn the crank and the crane is free.

Fully Adjustable

Splice bars quickly adjust the grab hooks to any width of wheel. Special hooks are furnished for pneumatic tires. Very small clearance is required between wheel and fender or body. Two ranges of vertical lift for various wheel heights.

Powerfully Constructed

The Atlas Wheel Crane is built to handle loads far heavier than the largest truck wheels made. It cannot break or upset. Grab hooks have positive grip—the heavier the wheel, the tighter they hold.



Construction

1—Splice bars: machine steel.
2—Grab hooks: drop forged steel.
3—Crane standards: forged steel.
4—Wheel stop: machine steel.
5—Base: heavy forged channel steel.
6—Casters: cast iron.
7—Base tie rod: machine steel.
8—Crane arm: drop forged steel.
9—Crank: machine steel.
10—Swivel nuts: machine steel.
11—Standard brace: machine steel forged.

Will Lift a Ton

A Necessity in Garages and Service Stations

The Atlas Wheel Crane, operated by one man, removes or mounts the heaviest truck wheel in one minute. All four wheels of a big truck can be taken off, bearings greased and wheels remounted in less than half an hour.

Contrast that with the common makeshift methods, which often take three or four men half an hour to remove a single wheel, and most of the day for the complete job.

Big truck wheels weigh 600 to 1,500 lbs., and are hard to get at under the body. No wonder that the old methods often result in damage to bearings and that the men are sometimes injured and always exhausted.

Why waste highly-paid mechanics on this rough, unnecessary work when one man can do it better in one-thirtieth of the time with an Atlas Wheel Crane?

Big trucks are too expensive to be tied up a day for a simple adjustment, when the Atlas Wheel Crane will get them out of the garage and into productive work in half an hour.

Start now to save that time and labor. Send for full information and prices on Atlas Wheel Crane equipment for you.

Dealers: Here is a clean-cut selling proposition, without competition. Good territory is still open. Write for terms.

THE THOMSON AUTO SPECIALTIES CO.
Dept. A-6, 36-38 E. Chestnut St.
Columbus, Ohio

Twentieth Century Stage Line

A fleet of motor buses recently purchased from the Patriot Motors Co., Lincoln, Neb., will operate over a regular route in the El Dorado oil fields. Starting at the railroad at Potwin, they will carry passengers and mail to Ferris City, Oil Valley, Elbing, Eagle Station and Burns. This rural bus line is known as "The White Line Stage Company." The bus bodies used are built to accommodate 15 passengers, in addition to the driver, and are equipped with plate-glass, drop sash windows held in place by anti-rattlers. The outside over the flare is covered with sheet metal mounted over felt to prevent rattling. A door in the rear also furnishes a quick means of exit for passengers in case of accident.

Special Truck and Body Designed for the Sugar Beet Fields of Nebraska and Colorado

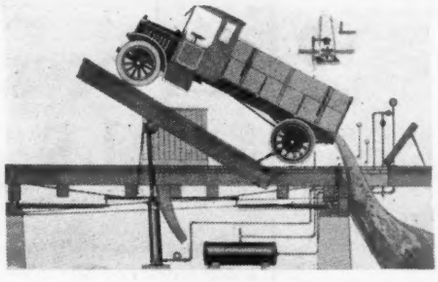
In order to make the truck economically practical in the sugar beet fields of the middle west, the Patriot Motors Company, Lincoln, Neb., after a careful study of the situation, recently placed a truck with a special body on the market especially designed for negotiating over sugar beet fields plowed 14 to 16 in. deep. These trucks are equipped with special dump bodies 11 ft. long, 5 ft. wide, having 2 ft. side panels and designed to dump on either side by a power-driven hoist which is located at both the front and rear of the body. It is driven by a power take-off connected to the transmission of the truck.

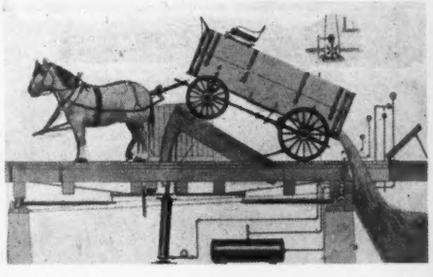
Lumbermen First to Adopt Trailer Hauling

Recent sales statistics compiled by the Trailmobile Company, Cincinnati, Ohio, shows that the lumber business comes first, with farmers second, and contractors, the hardware trade and the oil business in order named, as trailer users.

The lumber business was the first to adopt trailer hauling on a large scale and it still continues to be the largest purchaser of this type of hauling equipment, although many other lines are beginning to press it closely.

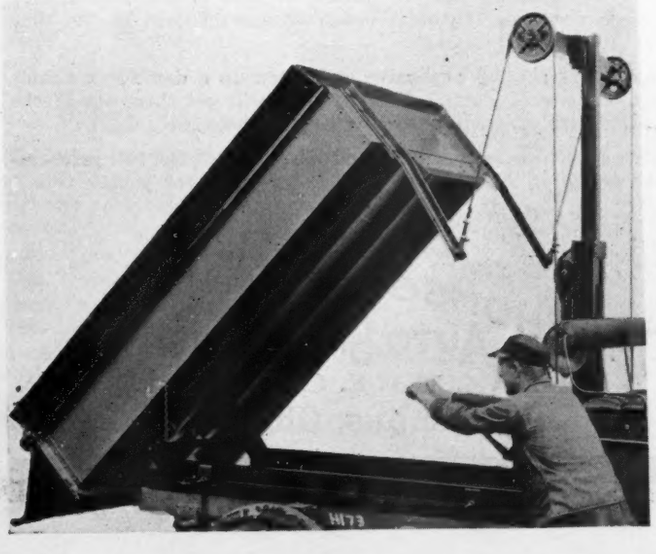
Foreign buyers have become very much interested in American trailers since they were used so effectively in the great war and the export demand is steadily growing.





Globe Combination Auto Truck and Wagon Dump Manufactured by the Globe Machinery and Supply Co., Des Moines, Iowa

This outfit, as may be seen from above, will not only fit any size, type or make of scale, but handles both wagons and trucks with equal facility, thereby accomplishing that which would ordinarily require two distinct dumps. This combination dump is a "dump within a dump"—an engineering principle which makes possible the raising of either the forward truck section or the rear wagon section by simply shifting the tilting cylinder forward or backward and turning on the air. The operation of this outfit is said to be entirely reliable and safe, the raising and lowering of either section is under complete control of the operator at all times. Air and control valves are located in either the scale room or on the work floor.



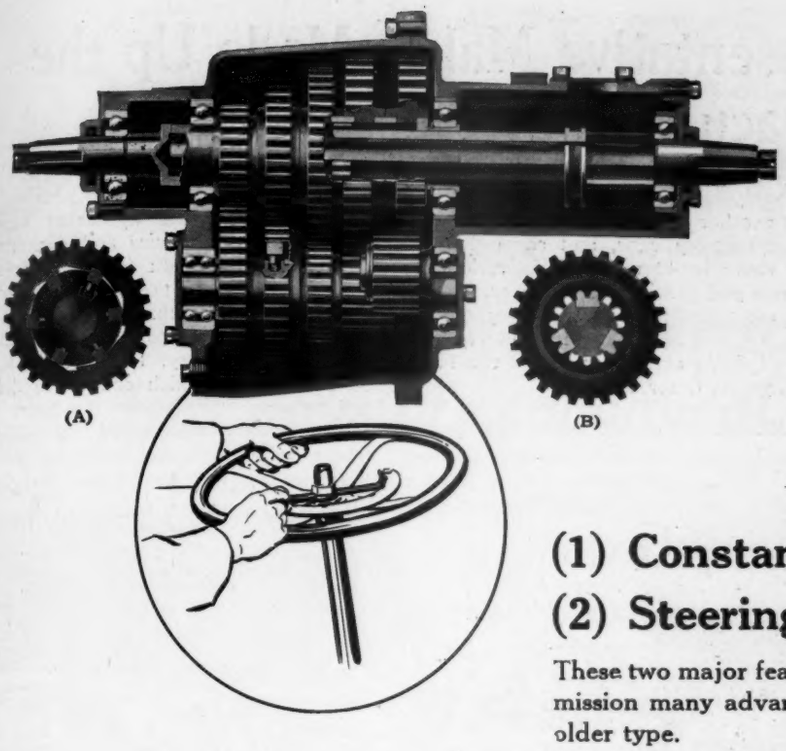
Combination Dump Body and Hoist Manufactured by the Archer Iron Hoist, Chicago, Illinois.

These bodies are of steel and are built in sizes of from 1 to 4 yd. capacity to fit any make of truck. They are also furnished with removable wooden flare-boards. The prices range from $270 to $650 for bodies of from 1 to 4 yd. capacity, inclusive.

Standard Body Designs on Master Truck Chassis for every business is a 9 x 12 catalog of sixty-two blue print drawings, reproduced by printing press, white lines on blue, resulting in a very vivid and clear presentation of various styles and sizes of bodies, cabs, hoists and four-wheel trailers. It is published by the Master Trucks, Inc., Chicago.

Governor Smith, New York, has signed a bill limiting the size of motor trucks in use on country highways to 8 feet in width, 12½ feet in height, with a combined weight of truck and load not to exceed 25,000 lbs. Very few trucks in the state will be affected by the law.

During the railroad strike emergency Delaware learned, by the breaking through of heavy trucks, that some of the road bridges were weak. They are being replaced by stronger structures.



(A) Full-floating action of dog clutch eliminates "jerking" when changing from high to a lower speed.

(B) Cross section of main drive shaft, showing sliding key construction which controls speed selection.

Blue prints, literature and test sets on request to manufacturers of motor cars and motor trucks.

(1) Constant-Mesh Gears
(2) Steering-Post Control

These two major features give the Power-Rite Transmission many advantages over transmissions of the older type.

Because its gears are constantly in mesh, the Power-Rite entirely eliminates gear shifting. And, for the same reason, it does away with the burring and stripping which so frequently results from the shifting of gears.

Speed changes are effected with remarkable swiftness by a simple lever-control on the steering post—a feature which also adds greatly to the ease and safety of driving, especially in congested traffic.

Through simplified construction the Power-Rite reduces transmission weight by approximately 25%, besides making all working parts readily accessible.

These and other advantages—notably stamina, strength and quietness of operation—have won for the Power-Rite the approval of leading engineers in the automotive industry. A long series of tests has proven the Power-Rite a practical as well as a superior type of transmission for both motor cars and motor trucks.

The Detroit Transmission Company

166 Lycaste Avenue **Detroit, Michigan**

POWER-RITE
"The Right Power at the Right Time"
TRANSMISSION

Seventeen Representative Makes Made Up the Syracuse Tour Fleet

By C. P. SHATTUCK

COVERED with dust, tired but happy, and with the band playing rollicking tunes, the fleet of trucks of the members of the Syracuse Truck Dealers' Association rolled into Syracuse the afternoon of May 22, completing a tour lasting six days among the agricultural sections of five counties. The tour was a huge success from the time the fleet of 17 different makes left the city on Monday morning until the arrival home.

Great Educational Work

The trucks traveled a total of 329 miles, visiting Onondaga, Oswego, Cayuga, Cortland and Oneida counties, stopping at the principal places, where H. E. Moorehouse and A. W. Carpenter, the latter of Buffalo, both of whom have been making an intensive study of farming conditions, talked to the farmers and others on the utility of the truck. Both of the speakers quoted facts and figures on farming and explained how trucks could be profitably used on the farm.

These talks were supplemented by practical demonstruations, the trucks hauling milk, live stock, hay, etc., in huge quantities, as the farmers and shippers took advantage of the offer of free transportation. On Wednesday over $7000 worth of live stock was hauled to a farm, where a sale was to be held later in the week. A large number of farmers were also transported in the trucks to this farm.

At Moravia the trucks hauled a huge amount of baled hay for a farmer who was ill and could not ship to the railroad. On another day the pneumatic tired trucks gave a demonstration of their practicability of picking up and delivering cans of milk over a route. The machines picked up and delivered 95 cans in 26 minutes over a 11-mile route.

At another dairy farm, one truck started with 50 empty cans, and covered a 12-mile route in 40 minutes, delivering the empties and picking up full cans. Similar demonstrations were given throughout the tour and frequently the trucks traversed plowed fields and other places the farmers suggested for a test.

Movies and Music Drew Crowds

Movies and the band proved a drawing card. Reels were shown of an ex-service man who is making his farm pay through the use of modern equipment, including a tractor and trucks. An additional feature was the big Mack army truck of the signal corps. On this was mounted an anti-aircraft searchlight, whose rays at night drew crowds to the meetings. One truck carried a farm electric lighting equipment and the apparatus supplied current for the movies and illumination.

Considerable credit for the success of the tour is due to the untiring efforts of John Barzee, tourmaster, and his committee, which comprised H. Bancroft White, C. F. Doty, H. N. DeWitt and R. M. Schiele, which committee did excellent work throughout the tour. The trucks closely maintained the schedule, but in those towns not observing the daylight saving law the trucks left before a large portion of the population reached the meeting place, owing to the hour's difference in time.

Making Ready for the Start of the Six Days' Tour of the Syracuse Truck Dealers' Association Through the Farming Regions of Five Counties

With one exception, all the trucks were equipped with pneumatics. No advertising was allowed, neither were sales solicitated. It was purely a demonstration tour. The trucks and companies entering same were as follows: Oldsmobile, Syracuse Garage Company; Atterbury, Syracuse Garage Company; Kelly-Springfield, Onondaga Truck Sales Company; Maxwell, Syracuse Motor Car Company; Reo, DeWitt Motor Car Company; Sanford, Durston Sales Company; Stewart, South End Garage, Federal, John Barzee; Larrabee-Deyo, Central Garage; Chevrolet, H. Bancroft White; Republic, Croly Sales Company; International, International Harvester Company of America; Dodge, C. F. Gilmour Company; Autocar, Onondaga Truck Sales Company; Garford, Byrne & Churchill; Mack, Signal Corps, and White, Western Sales Company.

Those dealers who participated in the tour state that it has accomplished much toward educating the farmer as to the practicability of the truck, and that they expect to cash in later as a result. The demonstrations were also very helpful to the sub-dealer.

The Committee Responsible for the Tour and Its Success
Reading from left to right: H. Bancroft White, John Barzee, C. F. Doty, H. N. DeWitt and R. M. Schiele

Apex
THE TWIN FRAME TRUCK

"The High Point of Truck Service"

NOT just a motor truck—
365 days of economical transportation

Explain to your Apex prospect that the Apex is not built just to look like a truck and sell as one. That its greatest value consists of unseen superiorities of engineering, construction and conscientious building.

Explain, too, what the Apex Twin Construction means—how it carries the truck mechanism while the regular frame carries the pay load.

Explain how this rugged construction, high-grade world-famous parts throughout and lack of unnecessary weight enables the Apex to serve long and well. Prove to your prospect, as you can, that the Apex 2½ ton—and the other models too—are the best trucks at their prices that money can buy.

Live truck merchants will be interested in our agency proposition. Write for particulars.

HAMILTON MOTORS CO.

Export Department: 25 Beaver Street, New York
Cable Address: "Hammotor" New York
Factory: Grand Haven, Michigan

The Reason
Twin-Frame Construction
Standardized Units

Motor—Buda.
Transmission—Fuller.
Carburetors—Stromberg.
Clutches—Fuller
Steering Gear—Lavine
Front Axles—Drop Forged I beam with Timken bearings.
Springs—Graded Construction Silicio Manganese Alloy.
Rear Axles—Torbensen Internal Gear.
Frames—Celebrated Apex Twin-Frame Construction.
Electrically Lighted Throughout.

Engineering Specifications on Application.

2½-Ton $2550
1½-Ton 1795
1-Ton 1595

These prices subject to change without notice

Metal and Rubber Markets

Delivery Difficulties Somewhat Mitigated But Enormous Stored Tonnage Still Inactive

While the steel industry made a distinct step in the direction of general improvement both in production and shipments of finished material to consumers, thereby relieving congested pressure of storing space in yards and warehouses, leading interests are still complaining of difficulties in getting full trains made up in mill terminals.

The automobile industry, while not as active as the period before the strike, is again in the market for steel, as production is being pushed with vigor to fill large unsettled bookings. Independents are quoting 7c to 7.50c for black sheets, 8c to 8.50c for galvanized and 5c to 5.50c on blue annealed.

The steel trade is being quoted $7 to $8 a ton, compared with $6 a short time ago. Several plants in eastern Pennsylvania and New York are troubled with light receipts of raw materials, mainly coal and pig iron, and further curtailment was forced on these operators.

Steel Products Prices

Per ton—Pittsburgh—			
Bessemer billets	$70 00	a	75 00
Open hearth	70 00	a	75 00
Forging billets	80 00	a	90 00
Sheet bars	70 00	a	80 00

Sheets

The following prices are for 100-bundle lots and over f. o. b. mill:

Blue Annealed Sheets—			
Pittsburgh (base)	$4 50	a	7 00
Philadelphia	3 80	a	7 25
Chicago	5 27	a	7 27
Galvanized Sheets of Black Sheet Gauge—			
Pittsburgh	$5 70	a	9 50
Chicago	5 97	a	9 77
Tin—Mill Black Plate—			
Pittsburgh	$4 35	a	9 00

Tin Plate

Tin plate, per base box	$8 00	a	10 00
Terne plate, I. C.	9 50	a	....
8-lb. coating, per package	12 75	a	13 75

Structural Material

Structural shapes, Pittsburgh	$3 00	a	4 00
Structural shapes, Philadelphia	3 25	a	4 25
Structural shapes, N. Y.	3 27	a	4 27

Finished Iron and Steel

Steel hoops and bands	$5 00	a	6 50
Tank plates, Pittsburgh	3 75	a	4 25
Tank plates, New York	4 02	a	4 52
Steel bars, New York	4 27	a	4 77
Steel bars, Pittsburgh	4 00	a	4 50
Rails—Standard Bessemer sections, mill	45 00	a	60 00
Standard, open hearth, mill	47 00	a	62 00
Light sections—25 & 45 lbs.	3 00	a	3 50

Iron and Steel at Pittsburgh

Bessemer iron	$43 90	a	....
Bessemer steel, f. o. b. Pitts.	70 00	a	75 00
Skelp, grooved, steel	3 75	a	5 50
Skelp, sheared, steel	4 00	a	5 75
Ferromanganese (80%)	225 00	a	250 00
Steel, melting scrap	25 00	a	25 50
Steel bars	4 00	a	4 50
Wire rods	75 00	a	....
Iron bars	4 25	a	4 50
Plain wire	3 00	a	3 75
Plain wire, galvanized	3 75	a	4 45
Cut nails, nominal	6 19½	a	....
Wire nails, Pittsburgh	3 25	a	4 50
Steel hoops	5 00	a	6 50
Chain rods	65 00	a	70 00

Copper Demand Remains Light

There was no material change in the copper market. Little buying is in progress. Consumers show no disposition as yet to cover third quarter requirements, and producers no anxiety to quote for this period until users show readiness to enter the market. Leading interests quote nominally 19¼c to the end of July, with the only business passing into the hands of outside smaller agencies, who have disposed of odd lots the past few days on an 18¾c basis.

ANTIMONY.—Sales at 9½c seem to make this the actual selling price, but the sentiment in the market is for a steady tone due to firmness in Chinese exchange and silver. Retailers ask 9¾c. London is £65.

GRAPHITE.—The demand is light, with very little business passing. Crude Mexican ore is quoted at $33.50 per ton between $50 and $60 a ton. Korean 3¾c a pound. Madagascar 9c a pound and Ceylon 4⅞c to 16c a pound.

TUNGSTEN.—The market has been dull with practically no business done. The general unsettled condition is seriously felt. Prices remain nominal at $6.50 to $7 for Chinese Wolframite. The Tungsten bill was postponed in the Senate and will come up again shortly.

OLD METALS.—Business in the scrap market is light, but the tone is somewhat firmer. This is especially true of No. 1 machinery composition and crucible copper. Most dealers are rejecting offers under 16½c for the former and 16¾c the latter. Lead is in good demand, but smelters are refusing to pay above 7½c delivered, with little available below 7¾c. Block tin scrap and pewter dishes declined, but are still scarce and active.

Aluminum—	Buying.	Selling.
Cast scrap	21¾a22¾	24¾a25
Sheet scrap	21¼a22½	23½a24
Clippings	24½a25¾	27½a28
Copper—		
Heavy machinery comp.	13¼a13¾	15¾a16½
Heavy and wire	13¼a13½	15 a15¼
Light and bottoms	12 a12½	14¼a14¾
Heavy, cut and crucible	14¼a14¾	16 a16¾
Brass, heavy	7¼a 7¾	8¾a 9¼
Brass, casting	8¾a 9¾	11 a11½
Brass, light	6¾a 7¼	8¼a 8½
No. 1 clean brass turnings	8 a 8¾	9¼a 9¾
No. 1 comp. turnings	10 a10½	12 a12½
Tea lead	4½a 4¾	5 a 5¼
Lead, heavy	6¾a 7	7¼a 7½
Zinc scrap	4¼a 4½	5¼a 5¾
Solder joints	10½a11½	12¾a13
New zinc clippings	5 a 5½	6 a 6¼
Pewter dishes	36 a38	40 a41
Block tin, scrap	47 a48	59 a51

OTHER METAL PRODUCTS.—Following are the prices current for brass and bronze products:

Copper sheets, not rolled	$20 50	a	....
Copper bottoms	38 00	a	....
Seamless tubing, bronze	34 50	a	35 50
Seamless tubing, copper	32 00	a	....
Copper rods	26 75	a	27 50
Copper wire	22 50	a	23 00
Cut lead sheets	12 50	a	....
High brass wire	25 25	a	....
High brass sheets	25 25	a	....
High brass rods	23 75	a	....
Low brass sheets	27 25	a	....
Low brass wire	27 25	a	....
Low brass rods	28 00	a	....
Nickel silver, 18%	39 50	a	....
Brazed tubing, brass	37 00	a	....
Brazed tubing, bronze	41 75	a	....
Brazed tubing, copper	41 75	a	....
Seamless high brass tubing	30 50	a	....
Seamless low brass tubing	33 00	a	....
Sheet zinc	12 50	a	....

Rubber Continues Steady

The market for crude rubber is very quiet and the situation lacks new features of interest.

Para—Up-river, fine	38	a	38½
Up-river, coarse	28½	a	..
Island, fine	40½	a	..
Island, coarse	21	a	..
Caucho, ball, upper	30¼	a	..
Caucho, ball, lower	27	a	..
Cameta	22½	a	23
Plantation—First latex, crepe	39	a	..
Brown crepe, thin, clean	38	a	38½
Rolled, brown, crepe	32	a	..
Smoked ribbed sheets	39½	a	..
Centrals—Corinto	28	a	..
Esmeralda	28	a	..
Guayule, wet	25	a	27
Balata, block, Ciudad	*55	a	57
Balata, block, Panama	*44	a	45
Balata, sheet	*1 00	a	..
Mexican—Scrap	*29	a	..

* Nominal.

SCRAP RUBBER. — Collections of boots and shoes are heavier than the demand, tending toward an accumulation along with an easy and depressed market. Auto tires are also overabundant.

Boots and shoes	7¼	a	7½
Arctics, trimmed	6	a	..
Arctics, untrimmed	5	a	..
Tires—Automobile	3¼	a	..
Bicycles, pneumatic	2½	a	..
Hose, steam, fire	1	a	1¾
Inner tubes, No. 1	..	a	14½
Inner tubes, No. 2	..	a	9

Federal Truck Transporting Urgently Needed Cletrac Tractors to Cleveland Tractor Co., Dealers in Lieu of Prompt Railway Service

25 Miles an Hour With a Two-Ton Load

Consider that a moment—a full 2-ton load at 25 miles an hour, and *with safety* to the truck and load.

The Jumbo Highway Express, as the name implies, is particularly designed for rapid interurban and long distance hauling.

It is amply strong to withstand the terrific road shocks to which it must be subjected (equipped with pneumatic cord tires and extra long flat-carrying springs). It has plenty of reserve power for any low gear emergency. It is completely equipped for efficient, economical, comfortable operation.

A few responsible dealers are offered direct factory contracts for exclusive territory on this epoch-marking truck. Send for full information.

Nelson Motor Truck Company
Saginaw, Michigan

Brief Specifications and Equipment

Standard 56-inch tread, Buda Motor, Clark Internal Gear Drive Axle, Clark Steel Wheels with pneumatic tires, power tire pump, power take-off, electric lights, starter, horn, generator and storage battery.

Steel cab with 3-man seat, heavy cushions, foredoors and disappearing curtains opening with doors, clear vision windshield, motometer, hub odometer, pigtail tow hooks, spring draw-bar and many other features. No extras to buy but the body.

The COMPLETE Truck

JUMBO
The Complete Truck

Taken From Current House Organs

The Spur to Success

Ambition is the spur which has kept men working for the achievement of great things under the most adverse conditions imaginable. In countless instances it has helped turn defeat into victory, failure into success.

An unflagging amibition, backed by intelligent, well-directed effort, can scarcely fail in being ultimately returned victor. It may take time; great things are seldom accomplished overnight, but final results usually compensate for the years of waiting.

Couldn't be Kept Down

When one loses ambition, when he ceases to set a mark beyond that which he has already reached, then immediately commences the process of decline and decay. Many a man has been dislodged from a pedestal reached only after years of tireless work, merely because he slacked up and tried to take it easy.

The fires of ambition should not be allowed to smolder, for then the brain will soon grow rusty and refuse to properly function. A man should keep always in training, both physically and mentally —then, when Dame Opportunity beckons, he's all set for a flying start.—*Republic Radio*, Republic Motor Truck Co.

Thou Art the Man

An interesting specimen of humanity is the man who always thinks they mean him. His shortcomings are being constantly shouted out to the multitudes from the pulpit, and vitriolic editorials in the local newspaper are always aimed diheld up everywhere as the sort of man not to be.

We recall an instance where a man, notorious for his ungovernable temper, was obliged to listen from one of the most conspicuous positions in a church, to a forceful arraignment of his chief fault by a minister possessing rare powers of oratory.

The man was confident that this part of the sermon was directed straight at him. The preacher was apparently looking him squarely in the eye much of the time, and frequently gesticulating toward that section of the church in which he was seated.

Yet the minister knew nothing at all of this man, and in denouncing the evil of an uncontrolled temper, was directing his shafts against no one in particular, but against all who were victims of this weakness. The fact that this one man felt so keenly the force of the attack was striking evidence of his fault.

A small-town newspaper, which was waging a fierce fight on prohibition, on one occasion published a purely imaginary story of a man who got intoxicated, went home, beat up his wife and tore things up generally. The day following the appearance of this issue, a big husky bustled into the office and announced his intention of thrashing the editor within an inch of his life.

Asked to explain his grievance, the man pointed to the story in question and declared that the editor had no business airing his domestic affairs. The editor explained the matter so satisfactorily that an exhibition of physical prowess was not only averted, but the man was humiliated at thus making himself so ridiculous. It was the guilty conscience again.

When a man is inclined to feel that criticisms of this sort are directed particularly at him, it's a sure sign that he has a fault which is badly in need of correction. And instead of becoming angry at having it forcibly brought to his attention, he should consider that he is benefited thereby, and take immediate steps to conquer such weakness.—*Republic Radio*, Republic Motor Truck Co.

Study the Roads

Bad roads have caused perhaps half of the failures among highway transports companies. A careful study of roads over which the route is to be maintained should determine whether or not it is possible to operate a line successfully. The result of this study will be a large factor in deciding the size of trucks to be used, whether trailers can be employed, and the speed at which they can be operated. Their condition will be a large factor in the kind and cost of tire, equipment and the expense of maintaining the truck.

Things to know about roads are: Character or surface—concrete, brick, macadam, gravel, dirt; width of road and amount of traffic; drainage; grades; width and capacity of bridges; provision for snow removal (should figure on own plows).

Most of this information can be gathered by driving over the route, and by consulting County Highway Commissioners.

Competition

Most electric lines show small earnings, if any, because they parallel railroads. They hoped to get a large share of passengers and freight. In most cases it was discovered that there was not enough traffic to support two parallel and competing lines. Hence a lowering of service standards on both and often the failure of one.

It is therefore necessary for the highway transport man to know about railway, express, interurban boat and truck lines over the proposed route. He must know their rates, and the frequency and dependability of their service.—**Denbyman**, Denby Motor Truck Company, Detroit, Mich.

The Salesman

The salesman is a necessary factor in every successful business. Especially is this true of the salesman who goes out from his headquarters to call on the public.

You may not think so at once, but if you stop to consider the salesman's place in our domestic economy, it may give you another thought.

In large measure, the prosperity of the country depends upon the men who sell goods.

Many a factory or business house would come to a standstill if it did not send representatives into the field to tell the public of the merits of its merchandise.

The salesman is the pioneer in business, the missionary of trade, the advance agent of prosperity.

When he calls on you, give him a minute or two, that he may tell his story. What he has to say may prove to be of great value. You have all to gain and nothing to lose by listening to him.

The salesman's life is not an easy one. He is seeking to make his living. Wife and children are dependent upon him. He is engaged in an honorable calling.

Don't give him the cold shoulder. He is the door-opener for trade. He can help you. Let him show you how.—*Traffic News*, Federal Motor Truck Co.

Better Service

What is Service? The dictionary says a "required duty," "an assistance." How much effort did you spend last year as a duty or in assisting your customer to obtain more efficient and economical operation out of his truck? Compare your efforts along that line, with the billboard, newspaper advertising, sales promotion and all that sort of thing on the other side of the fence.

How many dollars did customers lose last year in your territory, waiting for parts to come from the factory? Why? We recently doped out how customers in one place lost 62 days in a month. The amount of commonly used parts needed in the local dealers' stock in that territory totaled $75. The number of orders referred to us were 13 and in each case the shipment went forward promptly. Suppose those trucks were worth $20 per day. How does the cost of time lost, $1240, compare with $75? Looking at that comparison, when will those customers be financially able to buy more trucks? How much money should be charged to you this year, on account "Days out of Service?"

How many owners did you make it a point to interview regularly last year? How many drivers are you personally acquainted with? Did you ask either if they had read the "Instruction Book"? Has each of these owners a service parts list? If he has not, what is his name? Address? Truck number or model?

Has any of these questions any bearing on either your or our failures during the past year? If they have, let's iron them out, right now. Did you ever sit and listen to a clock? It doesn't say, "tick, tock, tick," but it does say, "gone, gone, gone." —*Indiana Booster*, Indiana Truck Corp.

THE COMMERCIAL CAR JOURNAL

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Guaranteed Forgings

"STANDARD OF THE INDUSTRY"

WYMAN-GORDON

THE CRANKSHAFT MAKERS

Worcester, Mass. Cleveland, Ohio
Chicago, Ill.

TRUCK MANUFACTURERS! Speed Up Distribution - "The BOSSERT Way"

IT IS the truck user who ultimately decides whether your product shall prosper—or the reverse.

Today he is wrestling with mounting costs in every department of his business—and he will buy your truck on just one condition: if its operating costs are lower than your competitor's.

Are they?

Not if you put heavy, cumbersome, expense-devouring malleable iron, steel castings and drop forgings in your assembly.

Reduce Weight of Truck Units

USE BOSSERT PRESSED STEEL PARTS and cut down the weight of your truck amazingly.

Use them for the transmission covers, axle housings, brake drums, gear covers, etc. There are 200 BOSSERT PRESSED STEEL PARTS. Each one of them employed in your truck construction marks a distinct and definite reduction in weight over the heavy-operating-costs parts you have been using.

You will rapidly increase production, distribution, profits, just as soon as you begin using light-weight, economical, prestige-building BOSSERT PRESSED STEEL PARTS.

Our Engineering Department is prepared to *prove* just how BOSSERT PRESSED STEEL PARTS will effect large economies in the production of your truck. Send us your blueprints.

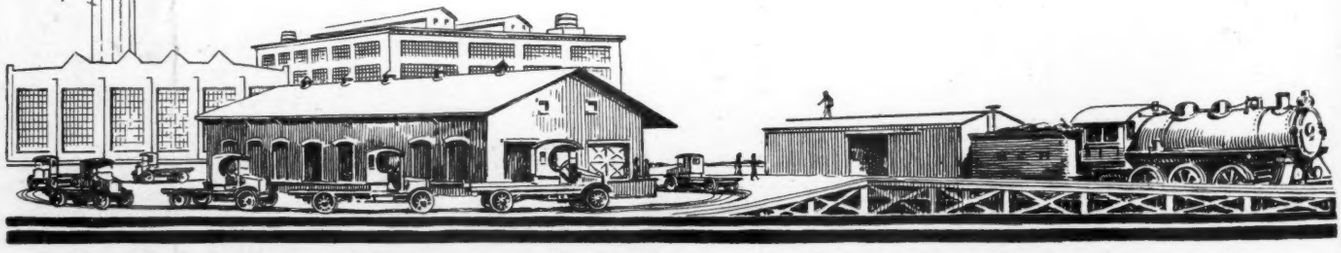
The Bossert Corporation

Main Office and Works UTICA, N. Y.

Branch Offices

CLEVELAND, 611 Citizens' Bldg. DETROIT, 1513 Ford Bldg.

NEW YORK CITY, 30 Church Street



BOSSERT PRESSED STEEL PARTS